MEMORANDUM

To:	Heidi Vonblum, City of San Diego
From:	Stephen Cook, Intersecting Metrics
Date:	March 16, 2022
Regarding:	Fire-Rescue Development Impact Fee Program – Unit Cost Analysis

1.0 Introduction

The purpose of this memorandum is to establish the cost that can legally be imposed on new development, within the City of San Diego (City), to maintain the current level of Fire-Rescue services and negate any potential impacts such development may cause.

To capture and account for the potential impacts new development may have on the City's Fire-Rescue system, the Fire-Rescue Fee was developed with two separate components. The first component will help to fund the additional infrastructure and costs needed to maintain the level of service and capacity, that is currently being provided by the City, as its service population (total employees plus residents) continues to grow over time. This is component referred to as the Service Capacity Cost. The second component of the program will be imposed on new development located in areas that currently experience a sub-standard level of service or may create additional strain on the existing system as their area grows. This component will determine new developments fair-share responsibility towards implementing additional Fire-Rescue infrastructure to achieve the required level of service within these areas. This component is referred to as the Facility Expansion Cost.

1.1 Project Background

The City is currently in the process of updating its DIF Program. The biggest difference with the updated DIF Program (as compared to the previous program) is that fees and associated nexus studies, are proposed to be calculated, collected, and allocated based on asset class instead of by community. Deriving and implementing the DIF Program based on asset class allows the City to collect and allocate fees on a higher geographical level than by individual communities, which helps to better fund and implement citywide assets that are shared throughout the City. This methodology is also more closely aligned with the City's needs to provide assets which serve the entire City. This methodology also acknowledges that fire stations are part of an integrated network of fire response infrastructure throughout the City.

1.2 Purpose

San Diego Municipal Code §142.0640 provides for the imposition and administration of development impact fees. Development impact fee programs are generally established and utilized to provide new or expanded public capital infrastructure needed to serve future development. The fees are established based on a methodology and calculation derived from the cost of the public facilities needed and the nature and size of the proposed development, also known as establishing

a nexus. A "rational nexus" must be established between the fee and the needs created by future development and the benefits incurred by the development. The nexus identifies a fair-share cost (or unit cost) of the needed capital infrastructure that can be allocated to individual developments based on a standard metric (e.g., project square footage, generated vehicle miles traveled (VMT), population and/or projected employment). The fees collected through a DIF program cannot be used to improve or mitigate current needs or deficiencies, only those associated with future growth.

2.0 Standards

This section documents the standards and methods that were utilized to determine the fair-share cost that new development will need to contribute to maintain the current level of service for Fire-Rescue Services within the City, or to expand infrastructure in sub-standard areas to ensure that new development contributes a fair-share toward achieving the standard.

The following policies are included in the *City of San Diego's General Plan Public Facilities, Services & Safety Element* which pertain to the standard of Fire-Rescue Service and Infrastructure that should be provided within the City. Maintaining the level of service prescribed by these policies will serve as guidance for identifying the impacts that new development will have on the City's current Fire-Rescue infrastructure as well as the fair-share cost that new development will be responsible for to maintain the systems current level or service or achieve these levels in sub-standard areas. It should be noted that the language below is an abridged version of the policies contained in the City's General Plan. Relevant pages from the City's General Plan are provided in Attachment 1.

PF-D.1. Locate, staff, and equip fire stations to meet established response times as follows:

Table 1: Deployment Measures to Address Future Growth by Population Density per Square Mile

	>1000-people/sq. mi.	1000 to 500 people/sq. mi.	500 to 50 people/sq. mi.	Permanent Open Space Areas
1st Due Travel Time	5.0 minutes	12.0 minutes	20.0 minutes	10.5 minutes
Total Reflex[1] Time	7.5 minutes	14.5 minutes	22.5 minutes	12.5 minutes
1st Alarm Travel Time	8.0 minutes	16.0 minutes	24.0 minutes	15.0 minutes
1st Alarm Total Reflex[1]	10.5 minutes	18.5 minutes	26.5 minutes	17.5 minutes

Source: City of San Diego General Plan Public Facilities, Services & Safety Element

Note:
[1]Reflex time is the total time from receipt of a 9-1-1 call to arrival of the required number of emergency units.

This policy sets the standard for the total time in which it takes Fire-Rescue services to respond to an emergency call. As shown in Table 1, the total response time (Reflex Time) for the required number of emergency units to arrive at the emergency response location, for areas where there are more than 1,000 people per square mile, is 7.5 minutes. There are only a limited number of developable areas within the City of San Diego with a population density less than 1,000 people per square mile. Therefore, a 7.5 minute response time was used as the universal standard for this program.

PF-D.2. Determine fire station needs, location, crew size and timing of implementation as the community grows.

As noted in Policy PF-D.2., the network of fire stations should expand as its population grows and its communities expand. The Fire-Rescue DIF serves a critical role in funding new infrastructure needed to accommodate the effects of future growth, consistent with maintaining standard levels of service.

PF-D.4. Provide adequate fire station site area (typical site is approximately 0.75 acre) and allow room for station expansion with additional considerations.

This policy sets the standard for the area of land required to build a new fire station. It is important that the Fire-Rescue DIF program accurately account for the costs to acquire the appropriate amount of land to construct new fire stations in areas of need.

PF-D.5. Maintain service levels to meet the demands of continued growth and development, tourism, and other events requiring fire-rescue services.

a. Provide additional response units, and related capital improvements as necessary, whenever the yearly emergency incident volume of a single unit providing coverage for an area increases to the extent that availability of that unit for additional emergency responses and/or non-emergency training and maintenance activities is compromised. An excess of 2,500 responses annually requires analysis to determine the need for additional services or facilities.

As noted in the introductory section, the Fire-Rescue DIF will have two components: (1) the Service Capacity cost that funds facilities necessary to maintain current levels of Fire-Rescue services citywide, and (2) the Additional Infrastructure cost that funds facilities needed to serve new development in sub-standard areas to ensure that new development contributes a fair-share toward achieving the standard. This policy reinforces the need for the Service Capacity cost portion of the Fire-Rescue DIF program and the need to maintain the current and desired capacity and level of service provided as the City continues to grow.

PF-D.6. Provide public safety related facilities and services to assure that adequate levels of service are provided to existing and future development.

This policy reinforces the need to implement the Facilities Expansion component of the Fire-Rescue DIF program. As new development expands into areas that ether provide sub-standard or limited Fire-Rescue services, due to their undeveloped nature, additional funding will be required to implement the facilities needed to service that new development to ensure acceptable levels of service.

PF-D.8. Invest in technological advances that enhance the City's ability to deliver emergency and fire-rescue services more efficiently and cost-effectively.

As noted in Policy PF-D.8., the City should continue to invest in emerging infrastructure which can more efficiently deliver Fire-Rescue services. This policy played a key factor in the decision to implement a standards based fee program instead of a planned based program. Using a standards-based approach allows the City to implement facilities in a flexible cost efficient manner,

while achieving the same standards outlined in the relevant City policies. A traditional plan-based program would not afford this same flexibility, as the technologies may not have been identified or developed at the time in which the plan was developed or adopted. Under this scenario, the plan and fee program would need to be amended before funds from the program could be invested on the identified technologies.

3.0 Service Capacity Cost

This section outlines the analyses and calculations utilized to develop the unit cost for the Service Capacity component of the fee program. As noted previously, the Service Capacity cost is intended to maintain the currently level of Fire-Rescue service throughout the City as new development occurs. This component of the fee program would be imposed on all applicable development within the City with the goal of increasing the overall capacity of the current system to accommodate these new needs.

3.1 Methodology

The unit cost to maintain the current Service Capacity for Fire-Rescue services was derived by first identifying the infrastructure, and its associated cost, that is currently in place within the City (Service) and then dividing that by the City's total service population (Capacity), as shown below:

$$\frac{Exisitng\ Infastructure\ Cost}{Citywide\ Service\ Population}$$

This method identifies the unit cost per employee or resident within the City to construct or implement the existing Fire-Rescue infrastructure. As new development occurs, and additional residents and employees come into the City, additional strain will be placed on the current Fire-Rescue infrastructure. As a result, the current infrastructure will need to be expanded to accommodate this new growth. Thus, this unit cost can be imposed on new development within the City to pay its fair-share to expand the current infrastructure and maintain current levels of service.

3.2 Maintaining the Existing Level of Service & Capacity

Table 2 outlines the Fire-Rescue infrastructure currently deployed within the City (as of May 12, 2021). Cost estimates for each infrastructure type are also provided in the table (Note: these are the costs for each individual piece of equipment, not the total for the City). The costs associated with the infrastructure and the number of units currently deployed within the City were provided by City of San Diego Fire Department staff. In accordance with the Mitigation Fee Act requirements, the funds generated through impact fee programs can only be used for infrastructure or capital facilities. Therefore, resources such as staff wages and expenses, on-going utility costs, and educational programs are not included within this program.

Table 2: Existing Fire-Rescue Infrastructure

Infrastructure	Existing Units	Individual Unit Cost
Aerial Truck	13	$1,700,000
Reserve Aerial Truck	7	$1,700,000
Aircraft Crash Truck (City Airports)	2	$1,500,000
Battalion Chief's Vehicle	7	$210,000
Reserve Chief's Vehicle	4	$210,000
Brush Engine (Type III)	11	$650,000
Chem Pickup Rig	2	$150,000
Communications and Command Van	1	$1,600,000
Environmental Response Team (ERT)	1	$200,000
Explosive Device Team and X-Ray Unit	2	$1,500,000
Fast Response Squad (FRS)	2	$350,000
Fire Engine	50	$1,030,000
Reserve Fire Engine	32	$1,030,000
Foam Tender	1	$750,000
HAZMAT Unit	2	$1,500,000
Reserve HAZMAT Response	1	$1,500,000
Lifeguard Vehicles	36	$50,000
Lifeguard Rescue Rig	1	$750,000
Light and Air Rig	2	$750,000
Mobile Canteen	1	$150,000
Shift Commander's Vehicle	1	$210,000
US&R Rig	2	$1,500,000
Reserve US&R	1	$1,500,000
Water Tender	2	$350,000
Fire Station - Standard	280,195 (SF)	$1,327
Fire Station - Standard - Land	31 (Acres)	$4,651,849
Fire Station - Battalion	51,115 (SF)	$1,327
Fire Station - Battalion Land	5 (Acres)	$4,651,849

Source: City of San Diego Fire Department, May 2021

3.3 Unit Cost Per Service Population

To identify the Fire-Rescue infrastructure unit cost per service population, the total number of units, currently deployed within the City, by infrastructure type, was divided by the current citywide service population (2,130,000 people). This results in the total number of people that are served by each unit of infrastructure. The total cost of the existing infrastructure was then divided by the total service population of the City to determine the cost per service population. Table 3 outlines this calculation for each infrastructure type and sums the total unit cost, by service population, to provide the total current infrastructure within the City.

Table 3: Existing Fire-Rescue Apparatus and Facilities Cost Per Service Population

Apparatus	Existing Units	Cost	Total Cost	Units Per Service Population
Aerial Truck	13	$1,700,000	$22,100,000	163,846
Reserve Aerial Truck	7	$1,700,000	$11,900,000	304,286
Aircraft Crash Truck (City Airports)	2	$1,500,000	$3,000,000	1,065,000
Battalion Chief's Vehicle	7	$210,000	$1,470,000	304,286
Reserve Chief's Vehicle	4	$210,000	$840,000	532,500
Brush Engine (Type III)	11	$650,000	$7,150,000	193,636
Chem Pickup Rig	2	$150,000	$300,000	1,065,000
Communications and Command Van	1	$1,600,000	$1,600,000	2,130,000
Environmental Response Team (ERT)	1	$200,000	$200,000	2,130,000
Explosive Device Team and X-Ray Unit	2	$1,500,000	$3,000,000	1,065,000
Fast Response Squad (FRS)	2	$350,000	$700,000	1,065,000
Fire Engine	50	$1,030,000	$51,500,000	42,600
Reserve Fire Engine	32	$1,030,000	$32,960,000	66,563
Foam Tender	1	$750,000	$750,000	2,130,000
HAZMAT Unit	2	$1,500,000	$3,000,000	1,065,000
Reserve HAZMAT Response	1	$1,500,000	$1,500,000	2,130,000
Lifeguard Vehicles	36	$50,000	$1,800,000	59,167
Lifeguard Rescue Rig	1	$750,000	$750,000	2,130,000
Light and Air Rig	2	$750,000	$1,500,000	1,065,000
Mobile Canteen	1	$150,000	$150,000	2,130,000
Shift Commander's Vehicle	1	$210,000	$210,000	2,130,000
US&R Rig	2	$1,500,000	$3,000,000	1,065,000
Reserve US&R	1	$1,500,000	$1,500,000	2,130,000
Water Tender	2	$350,000	$700,000	1,065,000
Fire Station - Standard	280,195 (SF)	$1,327	$371,818,765	7.602
Fire Station - Standard - Land	31 (Acres)	$4,651,849	$144,207,319	68,710
Fire Station - Battalion	51,115 (SF)	$1,327	$67,829,472	41.671
Fire Station - Battalion Land	5 (Acres)	$4,651,849	$23,259,245	426,000
		Total Cost	$758,694,801	
		Existing Service Population	2,130,000	
		Cost Per Service Population	$356.19	

As shown in Table 3, the total unit cost per person to maintain the current Fire-Rescue capacity and level of service within the City of San Diego is $356.19 per person.

4.0 Facilities Expansion Cost

As identified in Policy PF-D.6., the City is required to provide public safety related facilities and services to assure that adequate levels of service are provided to existing and future development.

Based on this requirement, an additional component of the fee will be imposed on development occurring in areas with sub-standard or potentially sub-standard Fire-Rescue services. This additional component of the fee is needed to help fund the additional infrastructure needed to adequately service these areas. As there is existing development in most of these areas, new development will only be responsible for its fair-share portion of the cost of the new infrastructure that is required. New development will not be charged for alleviating existing deficiencies.

4.1 Deficient Areas Analysis

As noted in Policy PF-D.1., the standard for emergency response time is 7.5 minutes for all areas with a population density of 1,000 people per square mile. All fire service areas within the City of San Diego have a population density of over 1,000 people per square mile, with the exception of District 43, located in Otay Mesa (775 people per square mile). However, the population within this community is anticipated to more than double[1] over the next 30 years, ultimately resulting in a population density over 1,000 people per square mile. Therefore, since the anticipated new development within this area is anticipated to increase the population density to over 1,000 people per square mile within the lifetime of this program, the 7.5 minute response time standard was applied to this area as well.

To identify areas within the City that have either existing or future projected sub-standard response times, a statistical model was developed to identify the key factors that contribute to sub-standard response times. The statistical model regressed geographic, social and infrastructure data against the 90th percentile response times experienced for each fire station[2]. The following components were initially included within the statistical model to identify if a correlation could be made in regard to response time:

- Station Size (Square Feet)
- Number of Dorm Rooms
- Bay Doors (Service Vehicle Capacity)
- District Service Area (Sq Miles)
- Annual Emergency Calls Received within the District
- District Service Population
- District Residential Population
- Service Population Density (Service Population Per Square Mile)
- Residential Population Density (Population Per Square Mile)
- Total Fire-Rescue Vehicles Stationed in the District
- Population Per Service Vehicle
- Emergency Calls Received Per Service Vehicle
- Population Per Emergency Calls Received

The data utilized in this analysis is provided in Attachment 2.

[1] Source SANDAG Series 13 Model: 2020 Otay Mesa population 27,715 people – 2050 population 61,477 people

[2] Due to the Covid-19 pandemic 2019 response time data was utilized in the analysis in lieu of year 2020 data, as it is thought to better reflect normal conditions.

Based on a hypothesis test, the following values were found to likely to be more meaningful additions to the model as a change in the predictor values are related to the changes of the observed response time (p-value):

- Station Size (Square Feet)
- Annual Emergency Calls Received within the District
- District Service Population
- Residential Population Density (Population Per Square Mile)
- Population Per Emergency Calls Received

These five factors were then run through a second regression analysis to develop a response time propensity model. Based on this analysis, the following equation was found to predict Fire-Rescue response times within the City:

Response Time = $9.79-7.13E^{-4}$*AC +$6.36E^{-5}$SF+$2.46E^{-5}$SP-0.050PC-$7.63E^{-5}$PD

AC=Annual Emergency Calls Received
SF = Station Size (Square Feet)
SP = Service Population
PC = Population Per Emergency Calls Received
PD = Population Density

Regression analysis work sheets are provided in Attachment 3.

4.2 Identification of Deficient Areas

To identify the areas within the City that currently experience sub-standard Fire-Rescue service or have the potential to experience sub-standard service with new development, the Response Time Propensity Model was applied citywide at the Census Block Group level. This converts the average response time from a station level, as cataloged in the *Yearly Unit Statistics Data* (see Attachment 2), to an individual Census Block Group level. As a result, it also identifies the areas that could strain the existing infrastructure and could cause sub-standard service.

Figure 1 displays the results of the Response time Propensity Model. The areas highlighted in red within the figure are the Census Block Groups that are projected to have sub-standard response times and require additional infrastructure, based on the response time propensity model, outlined in Section 4.1. The sub-standard response areas comprise almost 4,000 acres of land, which is approximately 72% of the total City area. As such, the Facilities Expansion component would be imposed within these areas because these areas are anticipated to require additional fire infrastructure to ensure adequate response times beyond those areas of the City that currently meet the standards.

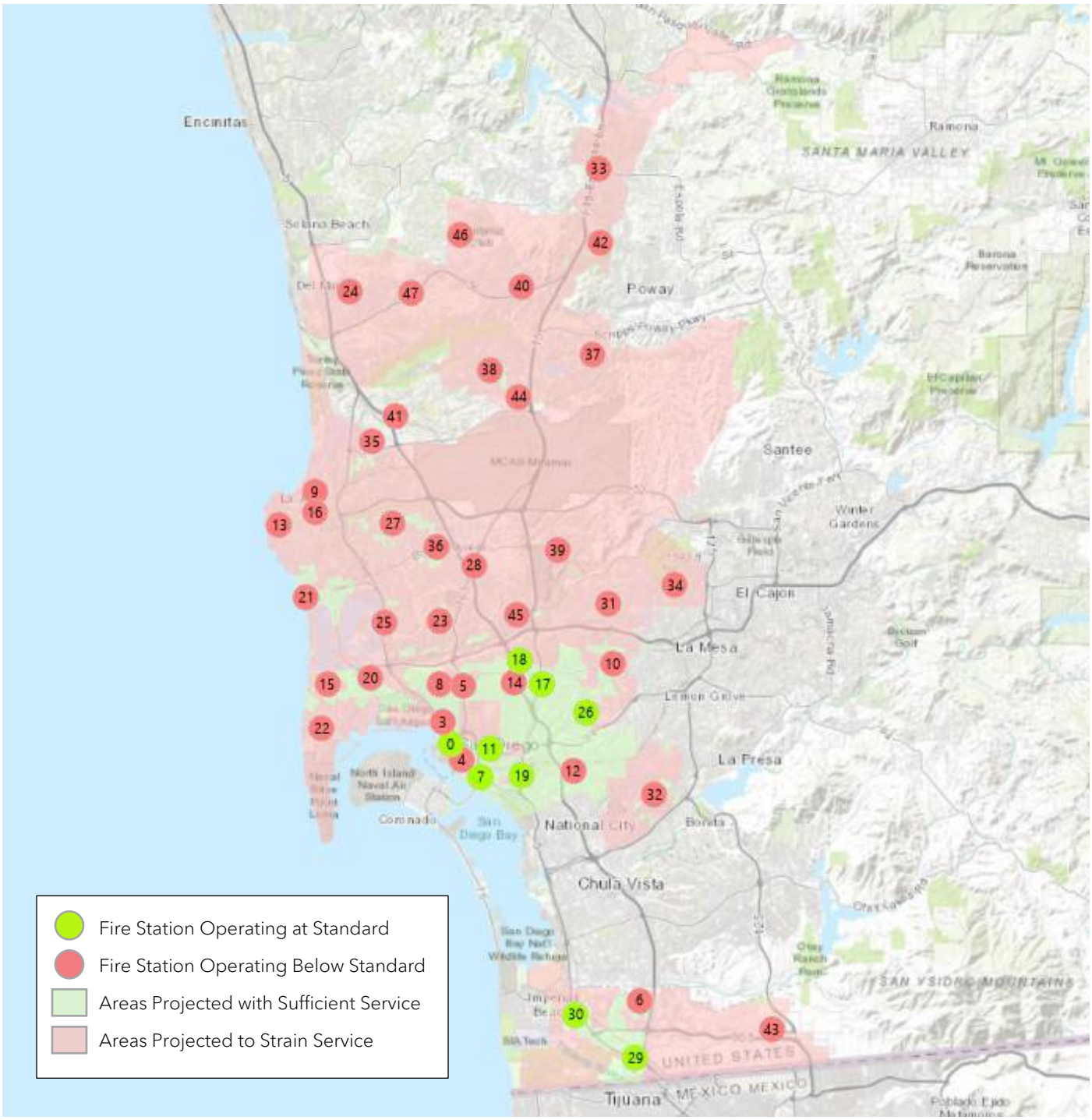

Figure 1 – Response Time Propensity Model

4.3 Needed Improvements

The City's Fire-Rescue system is evaluated by an independent entity approximately every five years. Citygate Associates, LLC performed the last review of the system in 2017. Citygate's review provided key findings of the City's fire station resource deployment system, the key risks that need to be protected, and the outcome of previous emergency incidents.

Several key findings were made in this report, with the following findings pertaining to the City's long-term Fire-Rescue infrastructure needs:

Finding #6: Even having grown over the years from five to seven Battalions, the northern and southern City station areas are not within 8 minutes travel times. It will take at least the addition of three more Battalion Supervisors per day to more completely cover the City. Adding these Battalion Supervisors also will increase the two-chief coverage on First Alarms.

Finding #11: If the City public road miles remain static, then Citygate would not recommend adding more than 10 infill gap fire stations to the present system. The remaining gaps are too small and, if necessary, could be covered with the use of Fast Response Squads or peak activity engine companies during daylight hours. Of course, any completely new growth areas could also be large enough to justify added fire stations in addition to the 10 infill gap stations identified.

Finding #16: Due to longer travel times, with the current quantity of fire stations, Fire-Rescue only has seven station areas performing better than the City's adopted Emergency Command and Data Center 9-1-1 call receipt-to-arrival time of 7:30 minutes/seconds. The station areas within the longer travel times also have the longest call receipt to arrival times.

All of the Citygate findings can be found on pages 9-12 of the *Standards of Response Cover Review* (prepared by Citygate Associates, LLC, February 2017), included as Attachment 4.

As noted in the Citygate findings, the City will need to expand its current Fire-Rescue infrastructure to include 10 additional fire stations, three of which should be Battalion Headquarters, to achieve adequate coverage in deficient areas. Therefore, the Facilities Expansion component of the fee program will use these findings as guidance for the future infrastructure that is needed and divide their cost among both existing and anticipated development within the identified deficient areas (as shown in Figure 1).

The current service population within the identified deficient areas is approximately 1,424,000 people. Based on the SANDAG Series 14 Year 2050 Model, the service population in these deficient areas is anticipated to increase to 1,865,000 people. This means that approximately 23.646% of the demand in these deficient areas would be associated with new growth [(1,865,000-1,424,000)/1,865,000]. Therefore, new growth that is subject to the Facility Expansion component of the fee program should be responsible for 23.646% of the total estimated cost to implement the recommended infrastructure. Table 4 outlines the cost for the recommended infrastructure as well

as the fair-share portion for new developments. Both Existing and Future Year 2050 Service Population data, by census block group, is provided in Attachment 5.

Table 4: Needed Fire-Rescue Apparatus and Facilities Expansion Cost Per Service Population

Additional Needs	Unit Cost	Units	Total Cost
Fire Engine	$1,030,000	10	$10,300,000
Battalion Chief's Vehicle	$210,000	3	$630,000
Fire Station – Standard (Square Feet)	$1,327	79,800 (SF)	$105,894,600
Fire Station - Standard – Land (Acre)	$4,651,849	5 (Acres)	$24,422,207
Fire Station – Battalion (Square Fee)	$1,327	39,906 (SF)	$52,955,262
Fire Station - Battalion Land (Acre)	$4,651,849	3 (Acres)	$13,955,546
Sub-Total			$208,157,614
New Development Fair-Share (23.646%)			$49,220,949
Cost Per New Service Population		441,000	$111.61

5.0 Fees

As noted in Section 1.0, the Fire-Rescue Fee is comprised of two components. The first component, outlined in Section 3.0, is the Service Capacity Cost which will be imposed to maintain the current levels of Fire-Rescue Service and Capacity as the City's service population continues to grow. As outlined in Table 3, the cost of this component is calculated to be $356.19 per member of the service population. This component would be imposed on all new development within the City, regardless of location.

As noted in Section 4.0, there are several locations within the City which current experience sub-standard Fire-Rescue services or were identified to put a strain on the system. Within these areas, an additional component of the fee will be imposed to provide the infrastructure needed to bring the level of service back to standard levels. New development within these areas will pay their fair-share of the infrastructure need to bring the system back to standard. The fair-share cost was calculated based on the anticipated growth in service population as compared to the existing service population within these areas, as displayed in Table 4. Based on this calculation new development within the red areas highlighted in Figure 1, can be imposed an additional $111.61 on top of their Service and Capacity fee ($356.19) for a total maximum allowable fee of $467.81.

Attachment 1
City of San Diego General Plan Policy Excerpts

Attachment 2
Response Time Propensity Model Source Data

Attachment 3
Response Time Propensity Model Analysis Sheets

Attachment 4
Standards of Response Cover Review

Attachment 5
Service Population Estimates