

As illustrated in the above map significant improvement in drive time thresholds are seen by adding or relocating SCFR fire stations. New locations and relocation of the Webster station are found in the following table.

<b>Proposed Fire Station Locations</b>	
Proposed Station #35	Wildwood near C-468 E pending a signed Development Agreement with Landstone Communities.
Proposed Station #22	Bushnell near CR 313 & C-48W Grant funded by The American Recovery And Reinvestment Act.
Proposed Station #36	Near Wildwood, NE 23rd Ave. & CR 505 pending a signed Development Agreement with Wildwood Springs.
Proposed Station #16	Development pulled. Station not needed until area developed.
Proposed Station #23	NE Area of County near W SR 44 & NW 18th Way funded with Impact Fees and CIP funds.
Relocate Webster Fire Station #12	Relocate from current location at 71 First Street, Webster to new location near intersection of SR 471 and C-478A.

The following points summarize key aspects relating to SCFR drive time maps.

- Current fire stations are strategically located in or near population centers.
- Four-minute drive time thresholds envelop city centers of the County’s five corporate municipalities.
- County areas, including western boundaries of the City of Bushnell, south and east of the City of Wildwood and Sumterville, fall outside 8-minute drive times.
- Major portions of I-75 lack 8-minute drive times from current fire stations.
- Annexed areas of Wildwood north of SR 470 lacks adequate drive time coverage. This corridor includes industry, commercial and residential units. Future growth must address fire service needs at time of development review.
- SCFR Station Location Plan reflects significant coverage improvements on proposed new stations and relocations recommendations. VPSD proposed station locations 2.5 mile radius do not extend deep enough into SCFR response areas to eliminate a need for new fire stations in northeast Sumter County.

**ISSUES/CONCLUSION:**

- SCFR management has developed a fire station location strategy to maximize fire rescue resource placement to current / future population centers and drive time objective of eight minutes. SCFR Triggers evaluate proposed developments for response time and call load from existing station. If this analysis fails, a new station is requested through development review. Many fire departments use a

benchmark of one station for 10,000 in population. Although used within the fire rescue industry as an accepted benchmark, 10,000 population is not based on an established standards. NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, 2004 Edition, uses the following response time objectives of full alarm assignment:

- Rural Deployment: Eight minutes or less for the arrival of an engine company to eighty (80) percent of the fire suppression and emergency medical incidents (rural area and urbanized cluster areas with under 15,000 residents as defined by the U.S. Census Bureau's 2000 census).
- Urbanized Cluster Area Deployment: Six minutes or less for the arrival of the first engine company to eighty (80) percent of the fire suppression and emergency medical incidents and a second engine company and a Supervisory Chief Officer within ten minute response time to eighty (80) percent of the incidents.
- SCFR and the VPSD should be strategic planning partners for future fire station construction. Discussions should include serving outlying areas of each jurisdiction, shared stations, joint staffing, and regionalized services.
- VPSD station locations selected in The Villages Public Safety Department Strategic Plan 2007 do not provide large enough response areas inside the county to eliminate the need for additional SCFR stations (e.g. Wildwood & SR 470). Based on current proposed station locations, SCFR and VPSD stations will provide minimal overlap over their concentric 2.5 mile response areas.
- Response time of SCFR units based on current station staffing (career / reserve) personnel will continue to be below industry best management practices discussed in the previous section. Opportunity exists with current career staffing to positively influence response time to all areas of Sumter County with 24-hour staffing assignments at Station #11 (Bushnell), Station #21(Lake Panasoffkee), and Station #31 (Wildwood).

**RECOMMENDATION:**

SCFR has done an admirable job with future fire station locations. The County should continue support for the SCFR Capital Improvement Plan (CIP) for Fire Stations. The department should develop and seek BOCC adoption of future fire station / staffing benchmarks. Benchmarks should be based on NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, 2004 Edition, Rural, and Urban Clusters deployment objectives.

The next section discusses SCFR call for service and workload.

#### **4. CALL FOR SERVICE WORKLOAD**

This section provides information on apparatus runs and response times achieved by the Sumter County Fire Rescue over the past three years. The following tables represent total calls for service by day of week from January 1, 2006 to December 31, 2008:

<b>Sumter County Fire Rescue Total Calls for Service by Day of Week</b>								
<b>Year</b>	<b>Sun</b>	<b>Mon</b>	<b>Tues</b>	<b>Wed</b>	<b>Thur</b>	<b>Fri</b>	<b>Sat</b>	<b>Total</b>
2006	1,054	1,166	1,056	1,050	1,124	1,160	1,149	7,759
2007	1,155	1,221	1,170	1,078	1,191	1,269	1,181	8,265
2008	1,085	1,064	1,209	1,116	1,139	1,151	1,111	7,875
Total	3,294	3,451	3,435	3,244	3,454	3,580	3,441	23,899

A comprehensive table of calls for service by time of day and day of week for the three-year period is located in Appendix L.

The following points summarize key aspects relating Calls for Service by time of day and day of week:

- SCFR responded to a total 23,899 calls or an average of 7,967 annually between January 1, 2006 and December 31, 2008.
- SCFR average daily calls for service is 21.8 incidents based on a three-year history.
- SCFR busiest period is between noon and 6 PM with hourly daily average of 0.8 calls while the slowest period is between Midnight and 6 AM at 0.29 calls per hour.
- Friday is the busiest day of the week with an average of 22.9 calls and the slowest day is Wednesday, which averages 20.8 calls.

The next section will discuss SCFR call for service response times.

## **1. RESPONSE TIMES**

Between January 1, 2006 and December 31, 2008, SCFR responded to over 23,800 calls for service with 63.33% reached in eight (8) minutes or less. The following summary illustrate response times of the three (3) SCFR stations with 12-hour career staffing. The purpose of this exhibit is to show response time differential when a station is staffed with career personnel verse non-career staffing. For analytical purposes, the primary station engine was used to evaluate daytime and overnight staffing of the three stations.

<b>Sumter County Fire Rescue Response Times with Career / Non-Career Staffing</b>			
<b>Engine</b>	<b>Career Staffed</b>	<b>Non-Career Staffed</b>	<b>Improved Response Time with Career Staffing</b>
Engine #11 (Bushnell)	6.78 minutes	9.08 minutes	2.31 minutes
Engine #21 (Lake Panasoffkee)	8.14 minutes	10.93 minutes	2.79 minutes
Station 31 (Wildwood)	7.25 minutes	10.57 minutes	3.32 minutes

Career staffing of fire stations reduce average response times by approximately three-minutes (2.81 minutes). This reduction results from SCFR members ready to respond (Reflex Time) at either the fire station or mobile on fire apparatus.

Often used as best practices in the fire rescue, the National Fire Protection Association (NFPA) has established numerous standards used to benchmark levels of fire safety and department efficiencies. The American Heart Association offers standards for delivery of pre-hospital cardiac care, which establishes benchmarks for BLS and ALS emergency medical services. The following section will discuss elements

of the NFPA standards for structure fire and American Heart Association for cardiac arrest correlation to response times.

**(4) Fire Rescue Response Times are Centered on Preventing Flashover during Structure Fires and Brain Damage during Cardiac Arrest.**

The NFPA promulgated a document entitled: “NFPA 1710: Objective for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.” Recommendations contained in NFPA 1710 include time durations for processing 911 information, reaction time, and drive time to fire and medical emergencies. These include the following (all are taken from section 4.1.2.1.1 of NFPA 1710):

- “One minute (60 seconds) for turnout time.” This is also called reaction time, “out-the-chute” time, etc. This is the time that elapses between dispatch and when the units are actively responding.
- “Four minutes (240 seconds) or less for the arrival of the first arriving engine company at a fire suppression incident and / or 8 minutes (480 seconds) or less for the deployment of a full first-alarm assignment at a fire suppression incident.”
- “Four minutes (240 seconds) or less for the arrival of a unit with first responder or higher level capability at an emergency medical incident.”
- “Eight minutes (480 seconds) or less for the arrival of an advanced life support unit at an emergency medical incident, where this service is provided by the fire department.”

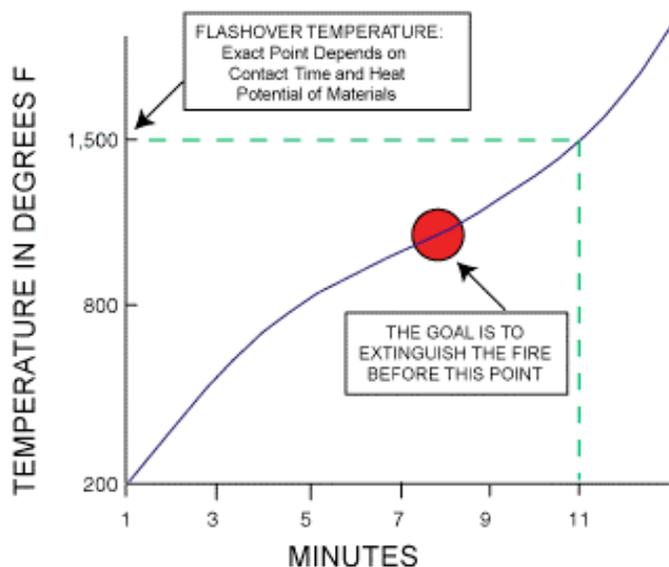
The project team from the Matrix Consulting Group recognizes each community differs from others. A combination of standards to ensure the highest degree of emergency services is provided for the residents while being budget conscious to the taxpayer. This approach allows a custom fit for local government.

Nationwide, a great deal of effort and research has been put into developing performance objectives for the delivery of fire, and EMS services. This effort is critical for agencies making decisions about deployment and location of emergency resources. The objectives promoted for fire/rescue and EMS have their basis in research condensed into two critical issues:

- What is the critical point in a fire's "life" for gaining control of the blaze while minimizing the impact on the structure of origin and on those structures around it?
- What is the impact of the passage of time on survivability for victims of cardiac arrest?

The chart, that follows, shows a typical "flashover" curve for interior structure fires. The point in time represented by the occurrence of "flashover" is critical because it defines when all contents of a room become involved in the fire. This is also the point at which a fire typically shifts from "room and contents" to a "structure" fire – involving a wider area of the building and posing a potential risk to structures surrounding the original location of the fire.

### Generalized Flashover Curve



Note that this exhibit depicts a fire from the moment of inception – not from the moment that a fire is detected or reported. This demonstrates the criticality of early detection and fast reporting as well as rapid dispatch of responding units. This also shows the critical need for a rapid (and sufficiently staffed) initial response – by quickly initiating the attack on a fire, “flashover” can be averted. The points below, describe the major changes that occur at a fire when “flashover” occurs:

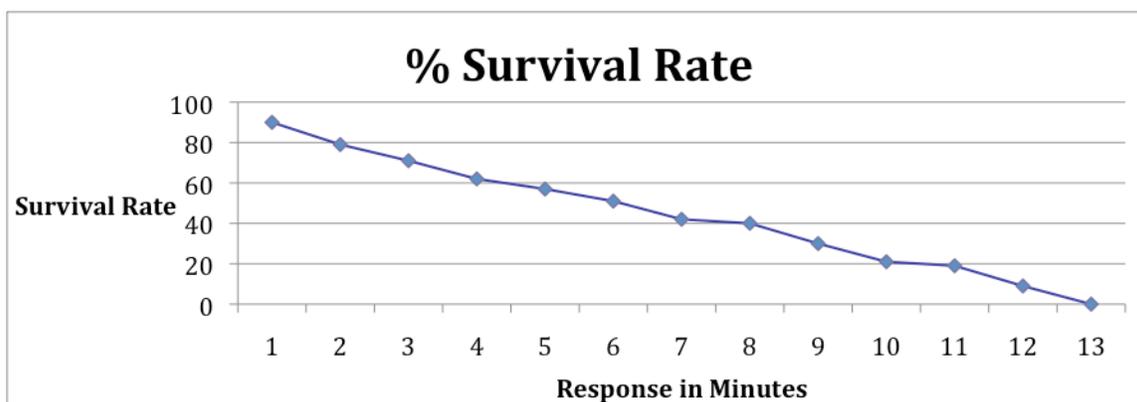
- Termination for effective search and rescue in a room involved in the fire. It means likely death of any person trapped in the room – either civilian or firefighter.
- Once this point in the fire is reached; portable extinguishers can no longer have a successful impact on controlling the blaze. Only larger hand-lines will have enough water supply to affect a fire after his point.
- The fire has reached the end of the “growth” phase and has entered the fully developed phase. During this phase, every combustible object is subject to the full impact of the fire.
- This also signals the change over from “contents” to “structure” fire, and the

beginning of collapse danger for the structure. Structural collapse begins to become a major risk at this point and reaches the highest point during the decay stage of the fire (after the fire has been extinguished).

- It should be noted that not every fire will reach flashover – and that not every fire will “wait” for the 8-minute mark to reach flashover. A quickly responding fire crew can do things to prevent or delay the occurrence of flashover. These options include:
  - Application of portable extinguisher or other “fast attack” methodology.
  - Venting the room to allow hot gases to escape before they can cause ignition of other material in the room.
  - Not venting a room – under some circumstances this will actually stifle a fire and prevent flashover from occurring.

Each of these techniques requires the rapid response of appropriately trained fire suppression resources that can safely initiate these actions. In the absence of automatic fire suppression systems, access to interior fires can be limited by a safety requirement related to staffing levels. Florida OSHA and related industry standards require the presence of at least 2-firefighters on the exterior of a building before entry is made to a structure in which the environment has been contaminated by a fire. In the absence of a threat to life demanding immediate rescue, interior fire suppression operations are limited to the extent a fire service delivery system can staff assuring a minimum of four-individuals actively involved in firefighting operations.

The second issue to consider is the delivery of emergency medical services. One of the primary factors in the design of emergency medical systems is the ability to deliver basic CPR and defibrillation to the victims of cardiac arrest. The table, below, demonstrates the survivability of cardiac patients as related to time from onset:



This graph illustrates that the chances of survival of cardiac arrest diminish approximately 10% for each minute that passes before the initiation of CPR and/or defibrillation. These dynamics are the result of extensive studies of the survivability of patients suffering from cardiac arrest. While the demand for services in EMS is wide ranging, the survival rates for cardiac arrests are often utilized as benchmarks for response time standards as they are more readily evaluated because of the ease in defining patient outcomes (a patient either survives or does not). This research results in the recommended objective of provision of basic life support within 4-minutes of notification and the provision of advanced life support within 8 minutes of notification. The goal is to provide BLS within 4 minutes of the onset of the incident (including detection, dispatch and travel time) and ALS within 8 minutes.

**ISSUES/CONCLUSION:**

- The American Heart Association and NFPA 1710 each establish best management practices for medical emergency and fire calls response times. A three-year history of calls for service reveal most response times are in eight (8) minutes or less. However, this data was generated from Data Pursuit CAD software where factual alert time may be erroneous (discussed in detail in previous sections). Regardless, opportunity exists to enhance current response times by 2.8 minutes by assigning career staffing from 12-hour shifts to 24-hour shifts.

**RECOMMENDATION:** Consider 24-hour staffing of career firefighters at three of the County's eleven (11) stations in accordance with NFPA 1710.

## **Appendix H**

### **FIRE PREVENTION SERVICES DISCUSSION**

In addition to responding to emergency calls for service, the SCFR also prevents or mitigates the potential for injuries, property damage, etc. through its fire prevention programming.

The Fire Prevention Bureau is responsible for new construction plan review, permit inspections and state mandated inspections.

The project team collected information on plan review and inspection activities, including fees collected by the Bureau, from 2006 to 2008. The exhibit, which follows this page shows plan reviews and inspections by type and fees collected.

As shown in the following exhibit, inspection activity remained steady, with a high of 163 inspections in 2008 and a low of 153 in 2006. Fire Prevention revenue dropped \$20,613 or approximately 30% during this period. The greatest difference in revenue was found in automatic fire alarm inspection fees where in 2006 \$40,372 was collected. Collection total for automatic fire alarms inspection fees dropped \$24,342 or approximately 40%. Final fire inspections had a similar drop with a loss of \$13,852 or 45.36%. Both automatic fire alarm and final fire inspections are sentinel indicators for new construction and as in many communities in America; in areas of Sumter County reviewed and inspected by SCFR Prevention experienced less new construction than in past years.

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Activity / Inspection Type	2006		2007		2008		Total	
	Inspections	Fees Collected						
Beer Liquor	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Misc (Site Assessments)	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
State Licensing	40	\$2,000.00	40	\$2,000.00	46	\$2,300.00	126	\$6,300.00
Corporate Assemblies	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Assembly, HazMat, Repair Garages	0	\$0.00	0	\$0.00	11	\$2,810.00	11	\$2,810.00
Final Fire Inspection / CNO	22	\$25,352.00	9	\$8,726.00	12	\$11,500.00	43	\$45,578.00
Automatic Fire Supp System	10	\$750.00	29	\$3,145.00	33	\$10,051.00	72	\$13,946.00
Carnivals and Fairs	3	\$0.00	3	\$0.00	3	\$2,500.00	9	\$2,500.00
Compressed Gases	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Exhibits & Trade Shows	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Explosives	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Automatic Fire Alarm	52	\$40,372.00	52	\$25,735.00	20	\$16,000.00	124	\$82,107.00
Flammable Liquid	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Flammable Liquid - Mix, storage room	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Flammable & Combustible Tank	1	\$150.00	3	\$450.00	15	\$3,050.00	19	\$3,650.00
Fire Hydrants & Valves	20	\$0.00	20	\$0.00	20	\$0.00	60	\$0.00
Hazardous Materials	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Industrial Ovens	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Liquid / Gas Vehicles or Equipment	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
LP – Gas	2	\$300.00	5	\$750.00	0	\$0.00	7	\$1,050.00
Open Flames or Candles	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00

**SUMTER COUNTY, FLORIDA**  
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Activity / Inspection Type	2006		2007		2008		Total	
	Inspections	Fees Collected						
Outdoor Place of Assembly	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Pyrotechnics	0	\$0.00	0	\$0.00	1	\$150.00	1	\$150.00
Spraying or Dipping	1	\$50.00	0	\$0.00	0	\$0.00	1	\$50.00
Standpipe Systems	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Temporary Membrane	2	\$200.00	1	\$100.00	2	\$200.00	5	\$500.00
<b>Total</b>	<b>153</b>	<b>\$69,174.00</b>	<b>162</b>	<b>\$40,906.00</b>	<b>163</b>	<b>\$48,561.00</b>	<b>478</b>	<b>\$158,641.00</b>

The following points summarize key aspects relating to SCFR Fire Prevention:

- During the three-year evaluation period, SCFR Fire Prevention averaged 0.66 inspections daily. In 2008, daily inspections averaged 0.68.
- Revenue generated from Prevention activities has decreased over the three-year period. There is a direct correlation between income and new construction. Examples of lost revenue from new construction include a 54.45% drop in Final Fire Inspections / CNO and a 38.46% reduction in Automatic Fire Alarm inspection.

**ISSUES/CONCLUSION:**

- Current Fire Prevention staffing is two FTE positions, Deputy Chief – Fire Operations / Fire Marshal and Fire Inspector. Based on current workload this assigned FTE position count appears heavy. However, it is important to take into account other assigned duties. The Deputy Chief – Fire Operations / Fire Marshal responsibilities above prevention tasks include fire operations, fire training, and logistics. Collectively, assigned prevention responsibilities in addition to other duties appear appropriate to current FTE allotment.
- Loss of Fire Prevention revenue is likely new construction driven. Proposed and new development awaiting economic turn-around will positively affect this trend.

**RECOMMENDATION:** No recommendations are warranted at this time.

The following chapter will discuss SCFR Stations and Equipment.

## **Appendix I**

### **ROLLING STOCK AND STATIONS DISCUSSION**

SCFR operates from 14 facilities including 11 fire stations, one (1) EMS Annex, one (1) Logistics Office, and one (1) Vehicle Maintenance Facility. The department has a total count of 86 fire apparatus and small vehicles for fire rescue protection, specialty teams, and administrative use. Appendix N, Table 1, provides details to station location, station size, functionality, and fire apparatus assigned. Appendix N, Table 2, provides an exhibit of SCFR apparatus. Revenue to purchase new equipment, refurbish existing equipment, and / or replace equipment originates from various revenue streams including grants, loans, and fees.

The current Sumter County Fire Facilities Master Plan, authored by the Fire Chief in October 2009, outlines specifics of department need based on current and future populations and calls for service. The master plan is found in Appendix O of this document.

#### **1. SCFR VEHICLE REPLACEMENT**

SCFR currently utilizes a 5-year replacement plan for fire apparatus and small vehicles. The 5-year Apparatus and Vehicle Replacement Plan is funded from various sources, including Fire Rescue Impact Fees (new apparatus only), Florida Association of Counties Trust (FACT), FEMA Fire Act Grant, Capital Outlay Reserve, and Fire Rescue Assessment Fees. The apparatus replacement schedule is 15 years for Engines, and 20 years for ladder trucks. Specialty apparatus such as brush trucks and tankers are replaced at 20-year intervals. The department also incorporates

refurbishing engines, tankers, aerial trucks, and certain specialty units to extend the useable life of this equipment by five (5) plus years.

Current frontline engines average 5.9 years with the newest purchased in 2008 and the oldest constructed in 1987. Squad trucks average 5 years old. The newest unit is a 2008 Ford F-450 and the oldest is a 1998 Dodge Ram. The department has two tower trucks, both manufactured by Sutphen Corporation. The newest tower truck was built in 1990 while the second truck was constructed in 1980. Both trucks have been refurbished and are in good working order.

Sedans driven by SCFR administrative personnel are typically patrol vehicles transferred from the Sumter County Sheriff's Office. Other equipment, including pick-up trucks, vans, utility vehicles, and smaller equipment (e.g. generators) have varying replacement targets. The following summary exhibit provided by Sumter County, shows the SCFR Fire Apparatus Five-Year Capital Improvement Plan (CIP).