WORKSHOP

Workshop on Fire Safety Infrastructure Needs in Unincorporated Leon County

Tuesday, February 25, 2014

12:00 - 1:30 p.m.

Leon County Board of County Commissioners' Chambers
Leon County Courthouse, 5th Floor

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Leon County
Board of County Commissioners

Notes for Workshop

Leon County
Board of County Commissioners

Cover Sheet for Workshop

February 25, 2014

To: Honorable Chairman and Members of the Board

From: Vincent S. Long, County Administrator

Title: Workshop on Fire Safety Infrastructure Needs in Unincorporated Leon County

County Administrator Review and Approval:	Vincent S. Long, County Administrator
Department/ Division Review:	Alan Rosenzweig, Deputy County Administrator Tony Park, P.E., Director of Public Works & Community Development
Lead Staff/ Project Team:	Tom Quillin, Chief, Emergency Medical Services Kathy Burke, P.E., Director of Engineering Services David McDevitt, Director, Development Support & Environmental Management Chad Abrams, Deputy Chief, Emergency Medical Services

Fiscal Impact:

This item has a fiscal impact. Should the Board direct staff to increase funding of hydrant placements from $30,000 to $100,000 per year, there is adequate funding in the current fire services fee fund. Additional fiscal impacts in out years would be considered as part of the L.I.F.E. program implementation.

Staff Recommendation:

Option #1: Increase the annual allocation of funding from the fire services fee that supports fire hydrant placement in areas where the infrastructure will support their placement from $30,000 to $100,000.

Option #2: Adopt the proposed draft policy on Criteria for the Placement of Fire Hydrants on Current Water Systems (Attachment #1).

Option #3: Direct that fire hydrant placement be considered for funding as part of the Livable Infrastructure for Everyone (L.I.F.E.) program.

Option #4: Direct staff to include consideration of a 2/3 matching program for water system fire protection improvement projects as a part of the L.I.F.E. program funding analysis.

Option #5: Direct staff to continue working with the City on the Water Masterplan implementation to ensure projects consider fire protection infrastructure improvements where possible.

Report and Discussion

Background:

At the December 10, 2013 meeting, the Board directed staff to schedule a workshop on fire safety infrastructure needs in older established neighborhoods in unincorporated Leon County. The Board approved scheduling this workshop at the January 21, 2014 meeting.

Analysis:

The firefighting capabilities of a community are largely dependent on two factors: the fire suppression capabilities of the fire department and the water infrastructure that supports those firefighting activities. In preparation for this workshop, staff focused on the water infrastructure that supports firefighting activities. However, the firefighting capability of the fire department is an important consideration in relation to this workshop, as consideration must be given to the ability of the fire department to bring an adequate supply of water to the fire scene. Therefore, a brief overview of the fire department response is provided.

This workshop item is divided into two major sections:

- **Fire Suppression Capabilities** - provides an overview of the firefighting capabilities of the fire department, as related to the ability to provide an adequate amount of water to a fire scene, and;
- **Water System Infrastructure** - provides an analysis of potable water systems within the unincorporated areas of the County.

Fire Suppression Capabilities

The County has had a long history of contracting with the City of Tallahassee for the provision of fire services in the unincorporated areas of the County. A contract for these services was originally executed in March 1988. That agreement was amended a number of times through 2005. The agreement contained an automatic five-year renewal clause for an indefinite number of periods, unless either party requested the agreement be terminated 24 months prior to the end of the then current period. On June 13, 2007, the City formally notified the County of its intent to terminate and renegotiate the then current agreement. The County successfully negotiated with the City to continue to provide fire services and a new agreement was executed in April 2009. At the March 12, 2013 meeting, the Board exercised the intent to terminate provisions of the Agreement in an effort to renegotiate the terms of the Agreement. The Second Amendment to the Agreement has been executed, and staff is working with the City on the implementation of the Agreement for the City to continue to provide fire protection in the unincorporated areas of the County.

The City provides firefighting services countywide from fifteen fire stations located throughout the County (Attachment #2). Five of the fifteen fire stations are located in unincorporated areas of the County in the communities of Lake Jackson, Miccosukee, Chaires, Woodville, and Fort Braden. The City provides fire suppression services to unincorporated areas of the County from all fifteen fire stations as the closest fire units are dispatched to fires regardless of whether the fire is located in the City or unincorporated areas. In addition, specialty and support units are dispatched to support firefighting activities to incident locations from the most appropriate fire station in relation to the operational needs at the fire scene and availability of fire apparatus.

The City has established designated responses to reported fires within the unincorporated areas to ensure that adequate personnel, apparatus, and water are available to extinguish the fire. These standardized responses take into consideration areas where the water system infrastructure supports urban firefighting operations with adequate fire hydrants vs. areas where there is no water system to support urban firefighting operations. Table 1 provides the first alarm response to a reported residential fire and Table 2 provides the first alarm response to a commercial property in the unincorporated area where firefighting operations is supported with adequate fire hydrants.

Table 1 – First Alarm Response - Residential fire in unincorporated area with fire hydrants

Unit Type	***Gallons of Water***
Rescue pumper	300
Tanker	2,500
Engine	750
Truck	300
Total Gallons	**3,850**

Table 2 – First Alarm Response – Commercial fire in unincorporated area with fire hydrants

Unit Type	***Gallons of Water***
Rescue pumper	300
Tanker	2,500
Engine	750
Engine	750
Truck	300
Total Gallons	**4,600**

In the unincorporated area with fire hydrants, an urban firefighting method is deployed where the first apparatus will attack the fire with the water supply brought to the scene while crews simultaneously achieve a continuous water supply by connecting fire apparatus to a fire hydrant. The fire hydrant then supplies water to the crews attacking the fire through the apparatus. This can be achieved using a single fire apparatus attached directly to the fire hydrant or by establishing water-pumping relays where the apparatus attached to the fire hydrant pumps water to the apparatus that is attacking the fire. This method of firefighting is referred to as urban firefighting tactics throughout this item.

Table 3 provides the first alarm response to a reported residential fire and Table 4 provides the first alarm response to a commercial property fire in the unincorporated area where firefighting operations is not supported with adequate fire hydrants.

Table 3 – First Alarm Response – Residential fire in unincorporated area without fire hydrants

Unit Type	***Gallons of Water***
Rescue pumper	300
Tanker	2,500
Tanker	2,500
Engine	750
Truck	300
Total Gallons	**6,350**

Table 4 – First Alarm Response – Commercial fire in unincorporated area without fire hydrants

Unit Type	***Gallons of Water***
Rescue pumper	300
Tanker	2,500
Tanker	2,500
Engine	750
Engine	750
Total Gallons	**8,850**

In the unincorporated areas without fire hydrants, a rural firefighting tactic must be employed where the first apparatus will attack the fire with the water supply brought to the scene while crews establish a continuous water supply using a tanker shuttle system. A portable tank that holds several thousand gallons of water is deployed on the scene. The apparatus that is attacking the fire will draft water from the portable tank to maintain the necessary water supply to attack the fire. Tankers will dump their water supply into the portable tanks and then go fill up again at the closest available water source return to the fire scene and dump their tank into the portable tanks. Adequate water supply for firefighting operations is achieved by continually refilling the portable tanks.

The number of tankers used to provide the water supply is based on factors such as the travel distance between the fire scene and the water source and the size of the structure on fire. National firefighting standards recommend the immediate availability of 4,500 gallons of water to fight a 1,800 sq. ft. home fire. Therefore, the initial response provided by the City fire department is adequate to handle residential fires in the unincorporated areas of the County. There are adequate tankers available to provide sufficient water to fight fires throughout the County.

The effectiveness of a tanker shuttle system is greatly improved when adequate water sources are readily available. Viable water sources for this purpose that have been identified are cataloged in the Geographic Information System and available in the field to fire department incident commanders, in the dispatcher center and considered during pre-planning exercises. Several fire hydrants have been added to areas where structure fires have occurred and hydrant spacing could be improved to increase the effectiveness of firefighting activities. Fire hydrants were added to the water system at Oak Fair and Chaires Cross Road and Buck Lake Road near Davis. As discussed in the water system infrastructure section of this material, the placement of fire hydrants is limited to areas where the water system infrastructure can support adequate fire flow.

At the April 24, 2012 meeting, staff recommended taking a more proactive approach to supplementing the availability of fire hydrants by placing hydrants in areas where the water system infrastructure will support additional hydrants. At that meeting, the Board approved an annual allocation of $30,000 from the fire services fee to identify and place fire hydrants in areas where the water system infrastructure would support their placement and the placement of the fire hydrant would improve firefighting capabilities. The locations of fire hydrants under this program is done in a cooperative manner with the water system utility providers, the volunteer fire department (VFD) chiefs, the chief of the Tallahassee Fire Department, Leon County Public Works Engineering, and the EMS Division Chief. Hydrants are placed in areas where the water system infrastructure will support their placement. Additionally, as noted in the attached Memorandum to the Board, consideration is given to the distance from another fire hydrant, the benefit to the public of the hydrant placement, and funding availability (Attachment #3).

Fire hydrants have been added in the following locations (Attachment #4):

- Lake Jackson Water System
  - Longview Drive at Kimbrel
  - Cypress Circle at Nature Lane
  - Crystal Brook Lane at Boxwood Lane
  - Hastings at Cunningham
  - Rockingham at Camden Road
  - Old Bainbridge near View Point Pond

- Leon West Water System
  - Frances Maple at Lake Atkinson
  - Pond Pine at Mastic Lane

- Meadows Water System
  - Tallyann Drive at Apalachee Parkway
  - Tallyann Drive at Chateau Lande
  - Louvinia Drive at Louvinia Court

- Bradfordville System
  - 9000 Broken Lance Drive
  - 278/283 Rosehill Drive East
  - Robinhood and Dartmoor Roads
  - 7817 McClure Road

Attachment #5 provides a map of fire hydrant locations countywide. Staff continues to work with community partners to identify additional areas of hydrant placement under this program.

Provided that water system infrastructure is not available in the Fort Braden community, an alternative water source was provided though the installation of dry hydrants along the shore of Lake Talquin. Dry hydrants are areas where PVC pipe is extended into the lake providing fire apparatus a connection to pump water out of the lake and then fill tankers that can deliver the water to the fire scene (Attachment #6). These hydrants are inspected by Tallahassee Fire Department personnel to ensure they are clear of debris and operational. Dry hydrants are located along Lake Talquin in the following locations:

- Blount Creek Landing
- Wainwright Boat Landing
- Ben Stoutamire Landing
- Luther Hall Landing
- Coe Landing
- Lake Talquin Dam near powerhouse

The placement of dry hydrants is an alternative that can be effective in areas where the water system infrastructure is not available or does not support fire flows. However, careful planning must be done to ensure that the water levels will support firefighting activities. Standards for dry hydrant placement recommend the placement of dry hydrants should be in lakes where the 50-year drought conditions will place the hydrant intake 2.5 feet below the normal pool elevation. In addition, dry hydrants are not recommended for placement in streams and rivers or in areas where the pipe must be extended more than 50 feet into the impoundment of water.

In addition to the fire suppression services provided to the County by the City, six VFDs support the firefighting activities of the City in the unincorporated areas of the County. The VFDs have a limited mixture of additional fire apparatus that is capable of delivering additional water supply to fire scenes. Provided the inherent nature of the VFD response, the City fire department does not consider the VFD response when dispatching the first alarm to a fire incident. Therefore, the VFD response increases the overall firefighting capabilities in terms of personnel, apparatus and available water supply to levels higher than those provided in Tables 1, 2, 3, and 4. In addition, the VFDs provide an invaluable service to the County in decreasing the number of fire stations and paid personnel necessary to make an adequate response to fires in the unincorporated areas of the County.

Water System Infrastructure

This section is divided into three subsections:

- Development Standards – provides an analysis of the applicable ordinances and regulations that control water system infrastructure in the unincorporated areas.
- Water System Franchises – provides an analysis of the water system franchises and their impact on fire protection infrastructure.
- Operational Considerations of Water Systems – provides an analysis of the operational considerations of water systems in relationship to fire protection infrastructure.

Development Standards

In 1980, the first formal requirements for minimum standards for potable water systems appear to be adopted by the County via Ordinance 80-29. This ordinance established the right for the County to determine the providers for the water system and focused on providing a safe water system designed by a professional engineer to meet the requirements of the Department of Environmental Regulation (DER). The main focus of this ordinance was for treatment and operation of public water systems to protect the public health.

In 1990, the Tallahassee – Leon County Comprehensive Plan first introduced the policies relating to development requirements for compact orderly growth with the introduction of the concept of an Urban Service Area (USA). The boundary for the USA was first adopted in 1991, and has changed very little in the ensuing years (Attachment #7). This consistency in the boundary is important for infrastructure planning and the systematic development of comprehensive water systems.

Within the USA, urban services such as central water, sewer, public paved roadways, and sidewalks were required for new development, thereby differentiating the development requirements/expectations between properties developed inside versus outside the USA. This workshop material only addresses the requirements pertaining to central water and fire flow.

The Comprehensive Plan established levels of service for the design of water systems to include domestic per capita consumption, peak fire flows for line sizing, production, and storage. These policies provide assurances that all the requisite components for adequate fire protection are considered when designing a water system. The level of service requirements is different between properties within the USA and those properties outside the USA. Outside the USA, urban services such as centralized water and fire protection are not required.

In 1992, the Comprehensive Plan Policies were translated into specific land development regulations via Ordinance 92-9. It was in this ordinance that the requirements for the design and installation of potable water lines to include fire flow provisions and fire hydrants were introduced. The fire protection requirements were codified in Chapter 10, Land Development Code (LDC), and Chapter 18, Utilities of the Leon County Code of Laws. Prior to the adoption of the Comprehensive Plan, USA and Ordinance 92-9, developments did not have to provide water systems that could provide fire flow, nor were fire hydrants required.

Ordinance 93-6, adopted on April 27, 1993, further clarified that any water system constructed within the USA shall be at least equal to the City of Tallahassee's (City) in regards to fire flow, water quality, and DER standards. These combined regulations have standardized development of water systems within the USA regardless of the service provider (City or Talquin). Therefore, this ordinance created a unified standard so that anything within the USA developed since its enactment would be expected to have sufficient line sizes, line pressure, storage, and spacing of hydrants to provide urban firefighting capabilities for the respective development density and construction type.

As stated earlier, the Comprehensive Plan and the LDC have different requirements for developments within the USA and developments outside of the USA. Since the concept of an Urban Services Boundary was not adopted until 1991, there are many subdivisions that are now located within the USA that do not have either water and/or fire protection because they were developed prior to the adoption of the development regulations that require this infrastructure. Examples of platted developments include subdivisions such as Edinburgh Estates, Harbinwood, Hill'n Dale, Autumn Woods, and Longwood Estates. A more thorough, but not validated complete, listing of subdivisions platted prior to 1990 is included as Attachment #8. This list does not include unrecorded plats and exempt subdivisions.

In addition, it is worth noting that, prior to 1990, the "residential subdivision of frequent choice" in the unincorporated area of the County was private and unrecorded. Recorded, public subdivisions were not the preferred development type/product during this period. The prevalence of unrecorded, private subdivisions inside the USA (outside of the City of Tallahassee) could certainly pose a set of unique issues for a fire protection retrofit strategy. Considering these developments there may be many more small pockets of residential development without water or fire protection scattered within the USA boundary. These subdivisions, developed prior to 1990, vary in their available infrastructure to three tiers of service levels:

Tier 1 - No public water lines or centralized water system

Tier 2 - Centralized potable water lines that are too small to provide fire protection via fire hydrants.

Tier 3 - Centralized potable water with some limited level of fire protection mixed with smaller lines.

This non-standardized mix of service levels resulted because the ordinance at the time of development only required that if central water was provided, the system had to meet certain water quality standards and fire protection was not mandated. It was left to the developer and the water service provider to determine if central water for domestic purposes was provided or if lines capable of providing fire protection with hydrants were provided.

The previous paragraphs described why there are many subdivisions within the USA that do not have urban fire protection system or lines of sufficient size to provide enough water to fight fires via a fire hydrant system. Simply put, this infrastructure was not required so developers generally did not provide it; likely, because of the additional cost. It is important to understand the current key regulations in existence today and their limitations and distinctions between what is required within the USA, and outside the USA. A summary of those regulations are as follows:

Regulations:

Per Section 10-7.523 of the LDC- Public Water Supply

(a) Potable water facilities, where required, shall be installed in accordance with standards, specifications, and policies of the County and the service provider except in the urban service area, where such facilities shall be installed in accordance with standards and specifications at least equal to those of the City of Tallahassee for water quality.

(b) New potable water service, within the urban service areas, shall be provided in a manner which promotes orderly, compact urban and cost efficient growth, and prevents leapfrog development, while optimizing the use of existing facilities.

(c) Connection and user fees shall be set at levels sufficient to equitably finance the water infrastructure projects in the capital improvements element of the Comprehensive Plan where "equitably" is defined as users paying their fair share of infrastructure projects.

(d) On or after May 1, 1993, all new developments within the USA shall be required to connect to a central water system if said system is made available within 1000ft of the subject property or proposed dedicated right-of-way or easement and within 180 days of the approval of the site and development plan, or issuance of development order, whichever comes first; or within 365 days if right-of-way or easements must be acquired to accomplish the extension. The City of Tallahassee within its franchise area and the public works department in all other unincorporated portions of the urban service area shall determine based on the above criteria, whether central water service is available and shall require a developer to finance, design, and build an off-site extension to serve a proposed development in order to meet the 180 or 365-day availability criteria.

If the system is not available as defined in the previous paragraph then the property owner shall be allowed to install private wells on individual lots, or community water system with central well(s) and distribution systems for potable water on no less than one-half acre lots. If a community water system is within the City of Tallahassee franchise area, upon completion of the construction of a central well(s) for a community water system, it shall be dedicated to the City, and the City shall then be responsible for its operation. The distribution system associated with such community water system shall be constructed and then dedicated to the City in the same manner as any other distribution system in the City system.

Under current regulations, if the subject property within the USA is deemed to not meet the available water criteria, the property can be developed without a central potable water system or fire protection via fire hydrants. However, since the adoption of these regulations in 1992, the demand for residential subdivisions inside the USA serviced with individual private wells on half-acre lots has been extremely limited. This is primarily due to the compact urban development concept implemented by the County through the establishment of the USA in the Comprehensive Plan, and the utilization of public infrastructure timing tools such as concurrency management in conjunction with utility franchise agreements with the City of Tallahassee. These growth management policies and implementing regulatory provisions have directed and incentivized development inside the USA at densities greater than two dwelling units per acre as allowed pursuant Section10-7.523 of the LDC (d) of the LDC.

Sec. 10-7.527. Fire protection facilities.

(a) All development approved pursuant to this article which is within the urban fringe which are served by public water supply systems of sufficient size and water pressure to serve hydrants shall also be required to afford fire protection by means of hydrants installed in accordance with the requirements and specifications of the county and the service provider. The service provider shall determine the number, placement, and location of fire hydrants.

(b) All development approved pursuant to this article which is within the Urban Service Area shall be required to afford fire protection by means of hydrant placement and fire flow in accordance with the requirements and specifications of the City of Tallahassee.

This section applies only if water meets the available criteria and does not apply if water is not deemed available.

In summary, many subdivisions that are now within the USA were developed prior to the adoption of regulations that required provision of fire protection as part of the overall development. The Board recognized that there would be a need or desire of residents within these older developments to upgrade their infrastructure to meet or come closer to meeting current fire protection requirements. Ordinance 93-6, enacted on April 27, 1993, established that these retrofits would be done via resident petition as a 2/3 project with the cost of the improvements assessed to the benefiting properties. Section 18-47 of the Utilities Chapter of the Leon County Code of Laws outlines the 2/3 process. To date, there has not been a 2/3 project undertaken for the improvement of the water system for fire protection. However, staff did assist the residents of the Autumn Woods subdivision in trying to get the necessary signatures for a 2/3 project, but the attempt failed.

Under current development regulations, developments outside the USA have a lower allowable lot density and are not required to install public water. Since these developments tend to be on acreage and have large lot frontages, it is difficult to meet the 1,000-foot distance threshold or economic feasibility requirement for the utility to provide central facilities. The developer could pay to extend the infrastructure. However, since provision of potable water outside the USA does not enable an increase in lot density, the increased costs for development generally does not support this additional expense. Further outside the USA, there is relatively little backbone infrastructure to support fire protection.

Water System Franchises

There are currently two main providers of potable water within Leon County, City of Tallahassee, and Talquin Electric. There are a few private systems, but these are fairly small in number and are not addressed in this agenda. In 2005, the Board approved a Water and Sewer Agreement that designated the entire County not served by Talquin Electric at the time of execution, to be within the City of Tallahassee's franchise area. Talquin could continue to serve its existing developments and could serve new developments if the City elected to waive its right to provide service due to the economics of providing the necessary infrastructure. Franchise area maps were developed to formalize the service areas at the time of the agreement (Attachment #9).

The 2005 Water and Sewer Agreement with the City of Tallahassee required the development of a long-range masterplan for the provision of water within the franchise area. The plan is required to be approved by the County and updated every five years. The Board approved the Water Masterplan on April 26, 2011. The Masterplan focuses on the ability to meet the projected demands for development in the USA. Key to the Masterplan development is the stability of the USA boundaries so that more accurate growth projections and sound infrastructure planning can occur. For each area currently not served, cost estimates were provided to construct new facilities. A summary of the Masterplan areas and estimated costs is included as Attachment #10.

Section 11.2.2 of the City's Masterplan had one specific target area for fire flow improvements. It was to provide a 1.5-mile loop from Hwy 90 along Barineau Rd to existing City water on SR 20. The City had funds in its FY2012 CIP to do the work, but deemed the project economically infeasible and deferred this project indefinitely until additional development occurs in the area. The 2005 Water Sewer agreement (Section 7d) stipulates that economic feasibility essentially trumps any other provision. The Barineau water line was deemed by the City to be infeasible due to the low development density, lack of probable connections, lack of measurable improvement in fire flow, and duplication/overlap of a large segment of the proposed line on SR 20 currently served by Talquin. Further, the City's calibrated model indicated that the existing lines close to Hwy 90 could provide adequate fire protection and that the additional coverage area on Barineau Road was not enough to warrant the estimated $640,000 cost.

County staff reviewed this information and the water model flow projections and concurred with the assessment that fire flows near Hwy 90 were acceptable. Staff understood about the duplication of the lines on SR 20 with Talquin and requested alternative projects. The City held firm that the Masterplan does not commit to a specific project and merely allocates $100,000 for fire protection upgrades system-wide. While the economic feasibility requirement was not met for the Barineau Road extension, the City did evaluate adding waterline and hydrants at the end of Dome Level Road on Poplar and Elm to enhance firefighting capabilities of an existing neighborhood in the same area. The cost estimate for this small system upgrade is $270,000. The City is working to program their CIP and hopes to move forward with this project in FY15.

The City does consider adding or upgrading waterline whenever it does an infrastructure project. The Maylor/Taylor sewer project is an example where the City is relocating a lift station and constructing gravity sewer on Maylor/Taylor Roads between Dempsey Mayo and Mahan. The City decided to go ahead and add a waterline that meets today's standards for fire protection into this project to avoid having to disturb this neighborhood in the future. This waterline is estimated to cost approximately $200,000. When completed in the next year, the homes along Maylor/Taylor Roads, located in the unincorporated area, will have waterline and hydrants meeting current regulations provided by the City of Tallahassee. The City will continue to evaluate and consider the provision of water systems capable of meeting urban firefighting capabilities as they design and implement future projects.

It appears that, in general, prior to 1990, if the City of Tallahassee served the subdivision with water, the developer was required by City regulations, to provide water services that supported fire protection. Based on spacing of hydrants in these older developments, the location and number of hydrants are less than what would be required under the current rules, but fire protection still exists. If a developer constructed a system in a Talquin service area, neither the County nor Talquin's regulations required provision of water lines capable of providing urban fire protection. It is important to note that these subdivisions met the infrastructure standards in place at the time of development with the provision of pipes sized for domestic water only. An exception is Killearn Lakes, where the infrastructure the developer provided was designed, supports, and provides urban firefighting capabilities with the provision of hydrants. This urban firefighting design was likely the result of the DRI process.

Fire hydrant spacing and required fire flow is determined by the City, based on the proposed housing density. The smaller the lots, the closer the hydrant spacing, and the higher the required fire flow becomes. The higher the fire flow, the larger the line is needed to meet the flow requirements. The lowest fire protection threshold is 500 gallons per minute (gpm) with 20 pounds per square inch (psi) residual pressure. Therefore, the line size has to be large enough to carry this flow and the supporting system of pumps and storage tanks must be adequate to allow this flow level and still keep the minimum pressure of 20 psi in the line. If the line drops below this pressure, it can be subject to collapse and is considered compromised for potential contamination. This line size for fire flow can create some operational issues if there is not consistently high enough potable or irrigation demand to keep the lines flushed.

Operational Considerations of Water Systems

The two main issues to consider for retrofitting an existing subdivision to provide fire protection are 1) Operational issues, and 2) Economic feasibility.

State requirements for potable water quality are very specific for chlorine residuals to protect the public health, safety, and welfare. Line sizes for domestic/irrigation uses tend to be small whereas line sizes for fire flow are a minimum of 6" if looped and 8" if not looped. Further, these lines have to have sufficient storage and pressure to provide adequate fire flow. The larger line size needed to provide fire flows of 500 to 1,000 gpm are greatly oversized for normal residential domestic usage. The average household service line/meter provides about 8-16 gpm. Therefore, it takes a large number of houses in order to keep the water moving in a large line. If the water does not move, it becomes aged (stagnant). Chlorine breaks down with time and then loses its ability to protect the public from harmful bacteria that may be in the pipeline. Water that is in the closed pipe system that is aged may not meet the required chlorine residual mandated by DEP and required to assure a safe drinking water system.

Extension of lines sufficient for fire flow without enough connections will not generate enough flow to keep the age of the water low and the chlorine residual meeting state standards. The result is a continual operational issue of having to flush hydrants, which is a waste of this valuable resource and a huge burden on the water operator to provide the significant manpower necessary to conduct this flushing on regular intervals.

When the utility provider replaces smaller sized water lines with larger lines, they must also have underlying support infrastructure capable of providing the increased flow (gpm) and water pressure to ensure adequate water for firefighting purposes. In order to provide urban firefighting capabilities; the system often requires the addition or modification of wells, pumps and storage tanks. In some instances simply replacing the water line to a larger diameter and adding hydrants will not result in adequate fire flows through the system. An example of an area with this type of constraint is Woodville Rural Community. The City upgraded portions of the water system when they took over a small private system in Woodville with larger sized lines and hydrants. However, these hydrants are incapable of adequate fire flow because the City's elevated storage tank is too low to provide sufficient pressure to support a 500-gpm firefighting flow with a minimum remaining pressure of 20 psi. The City is unable to increase the pressure in the Woodville lines without making major improvements, (raising or replacing) its existing water storage tank.

In addition, while the actual water system lines are large enough to support fire flow, the City is concerned about increasing the pressure in the system because of the potential impact to the water pipes within the residences on the system. The old system operated at lower pressures and the increased pressure would likely result in damage to the water lines within the residences. This operational consideration is difficult to overcome by the water system utility as every household that is hooked up to the water system would likely require a retrofit of its internal water lines.

As stated previously, there are three tiers of water deficiencies:

Tier 1 - Subdivisions with no central waterlines

Tier 2 - Subdivisions with existing waterlines that are of insufficient size to support fire flow.

Tier 3 - Subdivision or parts of subdivision that have adequate line sizes and supporting infrastructure (storage and pressure) to provide fire protection with the addition of fire hydrants.

Tier 1 Areas

The Tier 1 subdivisions without any water may be difficult to economically provide water due to the large lot frontage and associated cost of providing the infrastructure as well as the significant logistical/operational issues of expected low utilization/connection rates thereby not providing enough flow to keep the water with enough residual chlorine to meet health standards. Based on the City's master plan, it is estimated that the cost to provide water to the approved target areas inside the USA without water is approximately $24 million (Attachment #10).

The City of Tallahassee through the water master plan has designed its wells, pumps, storage tanks, and distribution lines to accommodate the projected flows from the target areas that are within the USA boundary. The County would have to design and construct the water infrastructure for conveyance to the City for operation and maintenance. Since these areas tend to be existing low-density homes on wells, operational issues of water quality will be a concern as well as the needed connections of the residential homes to provide some revenue to cover the costs of the operation and maintenance.

Tier 2 Areas

The Tier 2 systems have centralized potable water, but the lines are too small to provide adequate flow for a fire hydrant system. Most of the Tier 2 systems are in Talquin service areas. Talquin estimates the cost of complete line replacement for all areas at $60 million. However, many of these subdivisions could be partially retrofitted with fire loops in strategic central locations. This would greatly enhance the proximity of fire hydrants for the area, but would not provide fire hydrants coverage for all lots within the subdivision. This limited approach to retrofitting would overcome the operational issues of water age and the need for continual flushing to meet water quality and chlorine residual health standards. In order to replace the existing 2- and 4-inch lines with 6- and 8-inch lines and provide the associated fire hydrants in more limited strategic locations, it is estimated that about $30 million would be needed.

Talquin Electric has service areas scattered throughout the county, with a concentrated area in the northwest side of town in the subdivision of Edinburgh Estates, Autumn Woods, Harbinwood, Lake Jackson Heights, etc. County staff has met with key Talquin staff and verified that their pump and storage system is capable of providing fire protection via a hydrant system if the pipe sizes were upgraded to handle the needed flows. Talquin has expressed a willingness to continue to work with the County should the Board desire to fund a program for strategic line upgrades to enhance firefighting ability via fire hydrants. In these public subdivisions, the customers are already connected to a potable system so mandating connections would not be required and if upgrade line locations were designed to self-flush the system, the operational issues would be addressed.

As the total costs indicate, the cost of line replacements and new lines is expensive. Budget numbers for estimating a turnkey water project including design, permitting, and construction of new waterlines outside of pavement is about $80-90/linear foot for 6- and 8-inch lines. Based on these costs and the scale of the various subdivisions, a modest waterline project would be several hundred thousand dollars.

Tier 3 Areas

The Tier 3 systems are located throughout the county, mostly in the Talquin Water Utility Franchise area, and have adequate line size and supporting infrastructure to provide fire flow; but, do not have fire hydrants installed. The systems generally represent portions of subdivisions and could most easily/cost effectively be retrofitted since only hydrants need to be added. The cost of each hydrant installation depends on the location, but ranges from $5,000-$8,000 per installation. It is estimated that approximately 300 hydrants could be installed in the Tier 3 areas for a total cost of about $1.8 million.

A relatively cost effective and near instantaneous outcome is to increase the funding for fire hydrant installation utilizing the fire services fee. This would maximize the capabilities of the existing infrastructure, but over time would concentrate hydrants in confined areas leaving remaining areas of subdivisions without any urban firefighting capabilities. Approximately $30,000 per year from the fire services fee is currently being spent on the installation of fire hydrants on lines and systems that can support it. Depending on the chosen location, approximately five or six hydrants could be installed. If the allocation were increased to $100,000, it is estimated that about 16 hydrants per year could be installed. Should the Board approve this increased allocation, staff recommends that a formal policy be adopted that incorporates the following feasibility criteria and selection process (Attachment #1):

Staff will request input from the following community partners regarding the location of possible new fire hydrants in the unincorporated areas of the County: Chief of the Tallahassee Fire Department; the Chiefs of the volunteer fire departments; Talquin Electric; City of Tallahassee Utility Staff; County Public Works; and the EMS Chief.

Staff, in consultation with these partners, will evaluate the possible new hydrant locations based on the following criteria:

- The water system infrastructure's ability to support hydrant placement and provide a minimum flow of 500 gpm while maintaining 20 psi of residual pressure for an extended period;
- The distance between the proposed new hydrant location and current hydrants in place. Areas that lack current hydrant protection will be given priority;
- Of the fire hydrants proposed, the hydrant locations that provide the greatest benefit (i.e. number of homes and businesses) will be given higher priority; and,
- Geographic diversity of new hydrant placements.

L.I.F.E. – Livable Infrastructure for Everyone

During the December 2013 Annual Retreat, the Board amended the County's Strategic Plan to include an initiative to ensure projects being considered for funding associated with the Infrastructure Sales Tax extension address core infrastructure deficiencies in rural areas. At the February 11, 2014 workshop to review the Sales Tax Committee's final report and consideration on the continuation of the Local Government Infrastructure Surtax, the Board approved the creation of the L.I.F.E program – Livable Infrastructure for Everyone.

The L.I.F.E. program creates an annual 2% allocation of the Local Government Infrastructure Surtax revenue to fund infrastructure improvements in areas that have infrastructure needs that currently do not have a funding mechanism. Should the Local Government Infrastructure Surtax be reauthorized, projects such as improving water systems to support firefighting activities could be considered for funding. As previously noted, there are approximately 300 fire hydrants that could be added to existing water lines. A portion of the L.I.F.E. funding could be utilized to address these installations. Additionally, the systematic upgrade of water systems for fire protection could be a significant long-term commitment of resources given the cost of approximately $500,000 for a mile of new 6- or 8-inch lines with hydrants. Given the L.I.F.E. funding is estimated initially to be approximately $760,000 a year, this commitment of resources may not be viable given the other significant projects that need to be undertaken.

Additionally, the Board could consider the establishment of a 2/3 matching program to provide a cost match for fire protection enhancement projects that provide urban fire protection within a subdivision. The match portion of the program could be funded though the L.I.F.E. program and be subject to funding availability.

As identified throughout this material the cost to improve the water system infrastructure to provide urban firefighting protection within the USA is well in excess of $100 million. While staff has presented several options that optimize the current water system infrastructure within the current confines of the economic resources of the County, it will take approximately 19 years at the recommended funding levels to add the 300 potential fire hydrants. However, this strategy still does not address Tier 1 and Tier 2 areas of the County where major improvements to the water system infrastructure will be required in order to provide fire hydrants. Without the L.I.F.E. program, there is no funding source that could support the cost of projects that improve the water system infrastructure in Tier 1 and Tier 2 areas and further improve fire hydrant placement in Tier 3 areas.

Conclusion

Providing a water system infrastructure that supports urban firefighting methodologies County-wide is a complex issue that presents major challenges. The information contained within this material provides a starting point for improving the water systems in place and making them capable of supporting urban firefighting. Major points of consideration include:

- The fire suppression capabilities of the Tallahassee Fire Department and the six volunteer fire departments is sufficient for supplying adequate water to fight fires even in areas where the water system infrastructure does not provide fire hydrants. The tanker shuttle system of delivering water to the fire scene is a common practice throughout the United States, meets modern firefighting standards, and provides adequate fire protection in areas where the water system infrastructure does not support urban firefighting.

- Many subdivisions that are now located within the USA were developed prior to the adoption of regulations that required provision of fire protection as part of the overall development. There is no requirement for the utility provider to upgrade the system to meet current regulations.

- Under current regulations, property within the USA can be developed without a central potable water system or fire hydrants if the subject property is deemed to not meet the available water criteria outlined within the regulations. However, since the adoption of these regulations in 1992, the demand for residential subdivisions inside the USA serviced with individual private wells on half-acre lots has been extremely limited. This is primarily due to the compact urban development concept implemented by the County through the establishment of the USA in the Comprehensive Plan, and the utilization of public infrastructure timing tools such as concurrency management in conjunction with utility franchise agreements with the City of Tallahassee. These growth management policies and implementing regulatory provisions have directed and incentivized development inside the USA at densities greater than two dwelling units per acre as allowed pursuant to Section10-7.523 of the LDC (d) of the LDC.

- Under current development regulations, property outside the USA can be developed without a central potable water system or fire hydrants. The lower allowable lot density makes it difficult to provide a water system that is economically feasible.

- The City of Tallahassee Utilities has made improvements to the water system infrastructure that has allowed the placement of additional fire hydrants and includes such considerations in their Masterplan development.

- Talquin has made improvements to the water system infrastructure that has allowed the placement of additional fire hydrants and considers such improvements as systems are upgraded and lines are replaced.

- There are operational constraints to upgrading the water system infrastructure to support fire hydrant placement. Water quality considerations must be analyzed to determine if the placement of water lines sufficient to support fire hydrants will meet DEP standards. In addition, upgrading current water systems for urban firefighting requires upgrades to pipe size and in some instances additional facilities such as wells, pumps, and storage tanks.

The options presented by staff improve the overall water system infrastructure already in place and provides a pathway to possibly funding more complex projects. This strategy will leverage the current water system infrastructure through current funding mechanisms, the City's Water Utility Masterplan, and the L.I.F.E. program. Based on the County Attorney's Office input, all of the expenditures of public funds for the water system improvements can only be used on public infrastructure.

Options:

1. Increase the annual allocation of funding from the fire services fee that supports fire hydrant placement in areas where the infrastructure will support their placement from $30,000 to $100,000.
2. Adopt the draft policy on Criteria for the Placement of Fire Hydrants on Current Water Systems.
3. Direct that fire hydrant placement be considered for funding as part of the Livable Infrastructure for Everyone (L.I.F.E.) program.
4. Direct staff to include consideration of a 2/3 matching program for water system fire protection improvement projects as a part of the L.I.F.E. program funding analysis.
5. Direct staff to continue working with the City of Tallahassee on the Water Masterplan implementation to ensure projects consider fire protection infrastructure improvements where possible.
6. Board direction.

Recommendation:

Options #1, #2, #3, #4, and #5.

Attachments*:*

1. Draft Policy on Criteria for the Placement of Fire Hydrants on Current Water Systems.
2. Fire Station Location Map
3. Memorandum to the Board Outlining New Fire Hydrant Placement Criterion
4. New Hydrant Location Map
5. Fire Hydrant Location Map
6. Dry Hydrant Schematic
7. Urban Services Area Boundary History Map
8. Public Subdivisions Platted Prior to 1990
9. Water Franchise Area Maps
10. City of Tallahassee Waterline Extension Master Plan Summary

Board of County Commissioners
Leon County, Florida

Policy No. 14-2

Title:	Criteria for the Placement of Fire Hydrants on Current Water Systems
Date Adopted:	February 25, 2014
Effective Date:	March 11, 2014
Reference:	N/A
Policy Superseded:	N/A

It shall be the policy of the Board of County Commissioners of Leon County, Florida, that a new policy, "Criteria for the Placement of Fire Hydrants on Current Water Systems" is hereby adopted, to wit:

The purpose of this policy is to establish criteria on the placement of fire hydrants that will enhance firefighting capabilities on current water systems in unincorporated areas of the County. The placement of fire hydrants under this policy is limited to public subdivisions and public water systems. The placement of fire hydrants in private subdivisions and on private water systems will be handled in accordance with applicable statutes.

The placement of new fire hydrants on current water systems, subject to annual allocation of funding, shall be evaluated based on the following selection criteria:

1. The water system infrastructure's ability to support hydrant placement and provide a minimum flow of 500 gallons of water per minute, while maintaining 20 pounds per square inch of residual pressure for an extended period.
2. The distance between the proposed new hydrant location and current hydrants already in place. Areas that lack current hydrant protection will be given priority.
3. Of the fire hydrants proposed, the higher priority will be given to hydrant locations that provide the greatest benefit (i.e. number of homes and businesses).
4. Geographic diversity of new hydrant placements.
5. The availability of other funding sources to support the hydrant installation.

Staff will request input from the following community partners regarding the location of possible new fire hydrants on current water systems in the unincorporated areas of the County:

- Tallahassee Fire Department
- Volunteer fire departments
- Water utility providers
- Leon County Public Works
- Leon County Emergency Medical Services

- EMS Posts
- Major Roads
- Streets
- City Limits
- County Boundary
- Major Lakes

Fire Zones

STATION

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Fire Stations

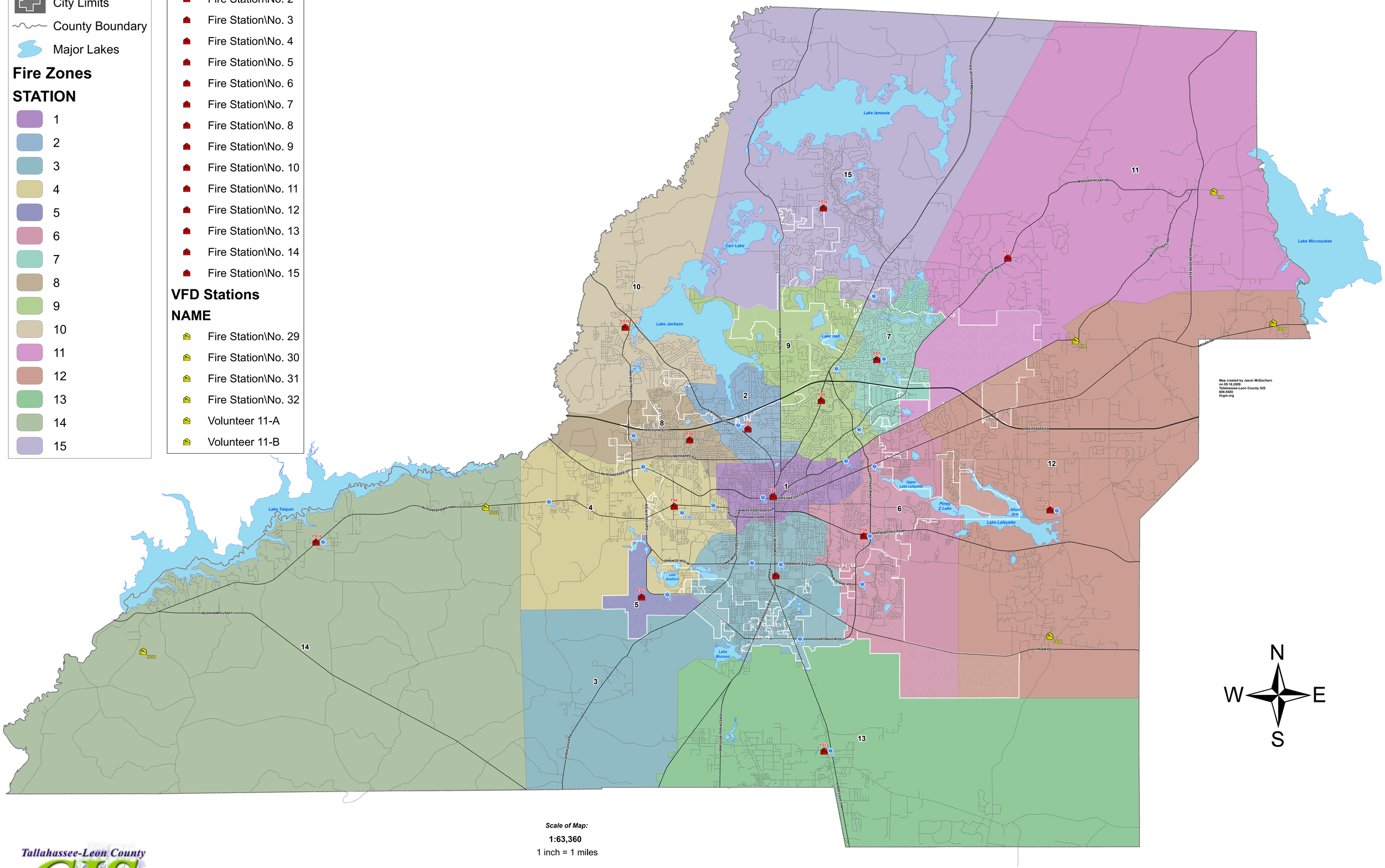
NAME

- Fire Station\No. 1
- Fire Station\No. 2
- Fire Station\No. 3
- Fire Station\No. 4
- Fire Station\No. 5
- Fire Station\No. 6
- Fire Station\No. 7
- Fire Station\No. 8
- Fire Station\No. 9
- Fire Station\No. 10
- Fire Station\No. 11
- Fire Station\No. 12
- Fire Station\No. 13
- Fire Station\No. 14
- Fire Station\No. 15

VFD Stations

NAME

- Fire Station\No. 29
- Fire Station\No. 30
- Fire Station\No. 31
- Fire Station\No. 32
- Volunteer 11-A
- Volunteer 11-B



N

W E

S

Scale of Map:

1:63,360

1 inch = 1 miles

0 1.25 2.5 5 7.5 10 Miles

Map created by Jason McEachern
on 09.16.2009
Tallahassee-Leon County GIS
606-5500
tlcgis.org

Tallahassee-Leon County GIS
WWW.TLCGIS.ORG

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Posted at 10:30 a.m. on February 19, 2014

BOARD OF COUNTY COMMISSIONERS
MEMORANDUM

DATE: June 18, 2012

TO: Leon County Board of County Commissioners

THROUGH: Vincent S. Long, County Administrator

FROM: Tom Quillin, Chief, Emergency Medical Services

SUBJECT: Fire Hydrants – Installation Criteria

During the April 24, 2012 meeting, the Board accepted the status report on fire hydrant and water utility and requested that staff provide a map of the locations in the county that do not have fire hydrants (Attachment #1).

As noted in the agenda item, the County has allocated $30,000 annually to support fire hydrant installations. This level of funding will support the installation of between three and four hydrants. This memo provides a report on the feasibility criteria and selection process that will be used to determine which fire hydrants will be added.

1) Staff will request input from the following community partners regarding the location of possible new fire hydrants in the unicorporated areas of the county: Tallahassee Fire Department Fire Chief, the volunteer fire chiefs, Talquin staff, COT water staff and Leon County Public Works.

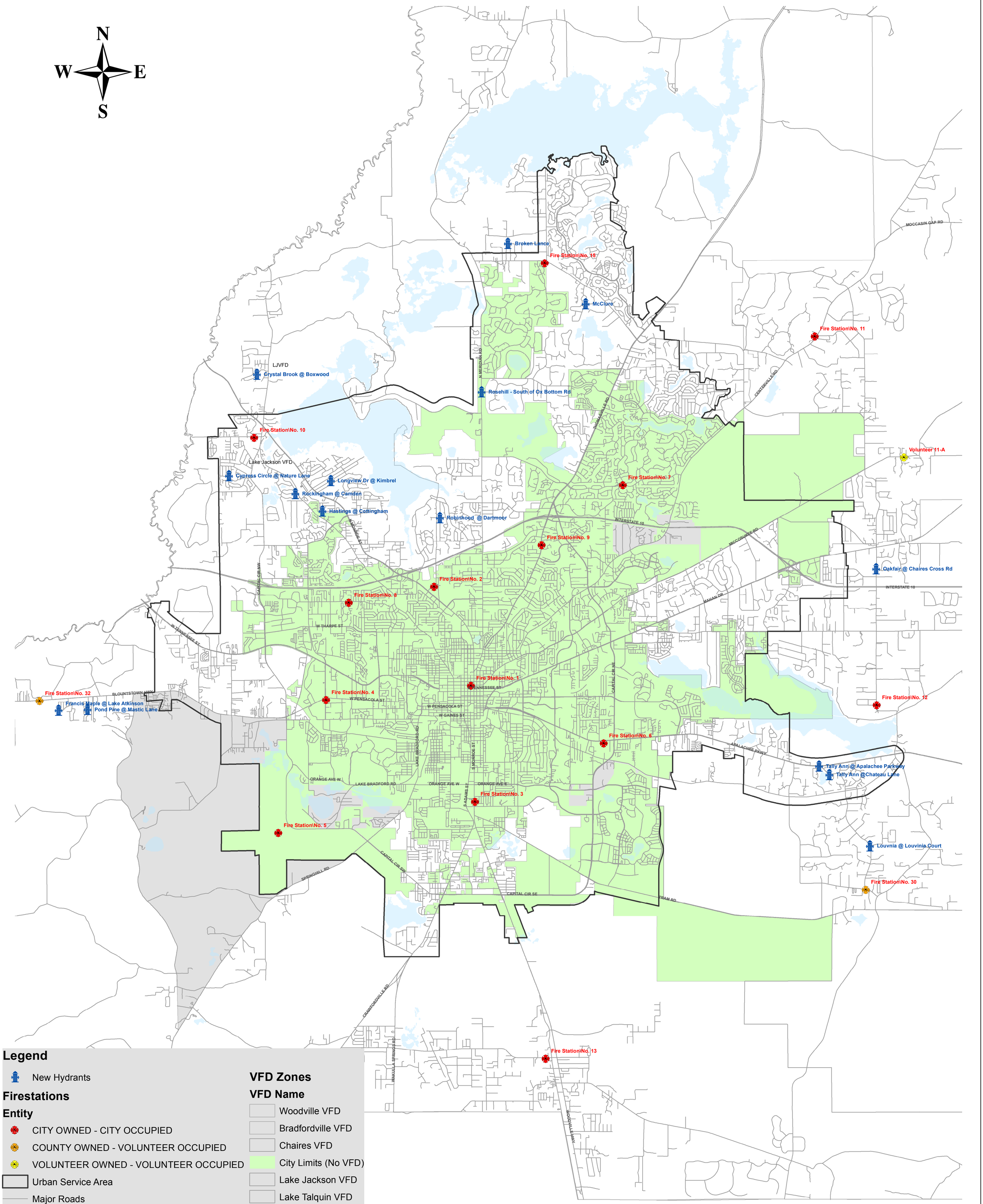
2) The EMS Chief, in consultation with the partners listed above, will evaluate the possible new hydrant locations based on the following criteria:

   a. Is there a water main present that is capable of supporting the required fire flow for a fire hydrant?
   b. What is the distance from other existing hydrants?
   c. Of the fire hydrants proposed, which hydrant locations provide the greatest benefit (ie number of homes and businesses).
   d. Is there any other funding available to support the installation?

Staff intends to proceed in seeking input from the entities noted in this item. Please advise if you have questions or require any further information.

Cc: Alan Rosenzweig, Deputy County Administrator

New Hydrant Locations



0 1.75 3.5 7 Miles

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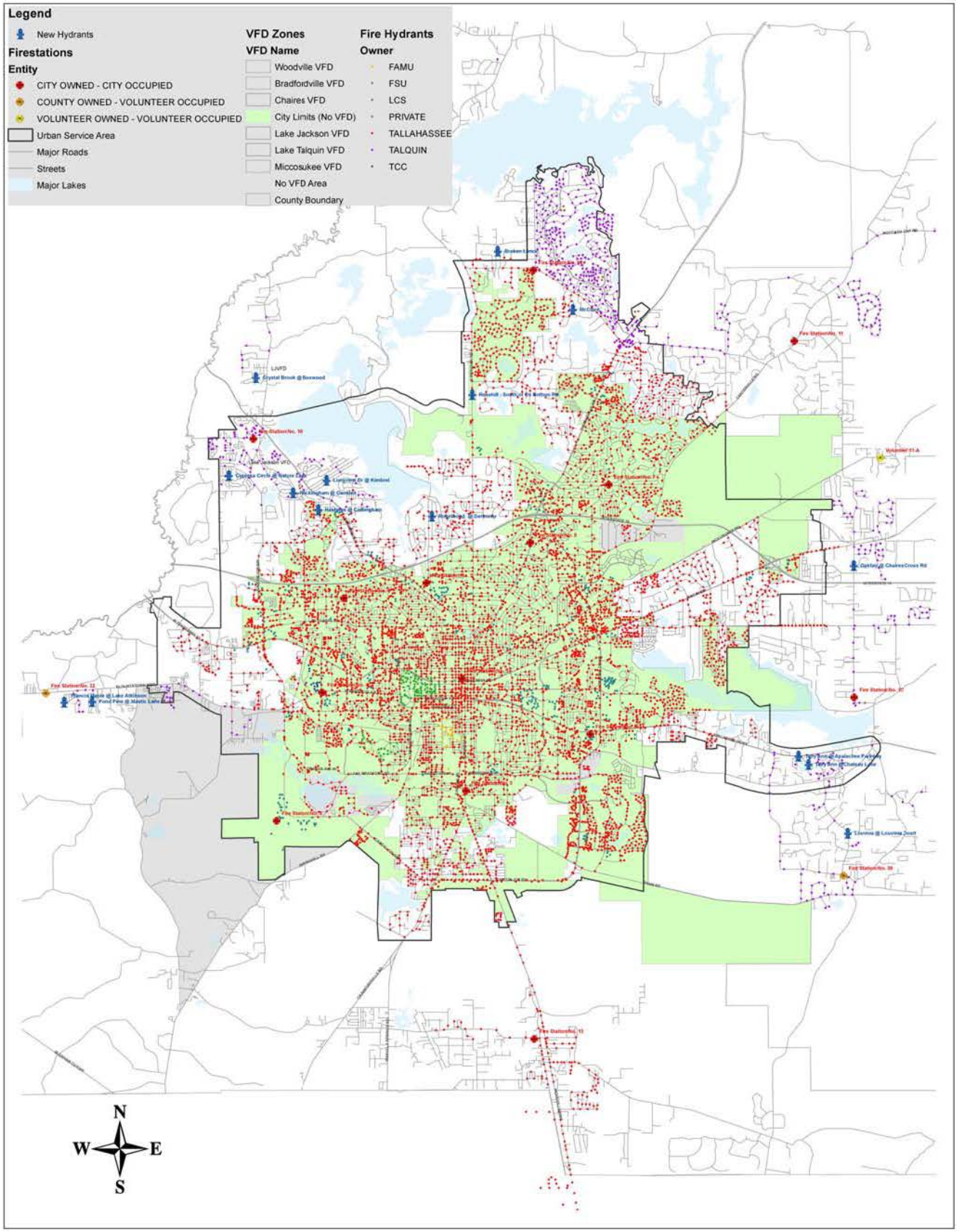
Hydrant Locations



0 1.75 3.5 7 Miles

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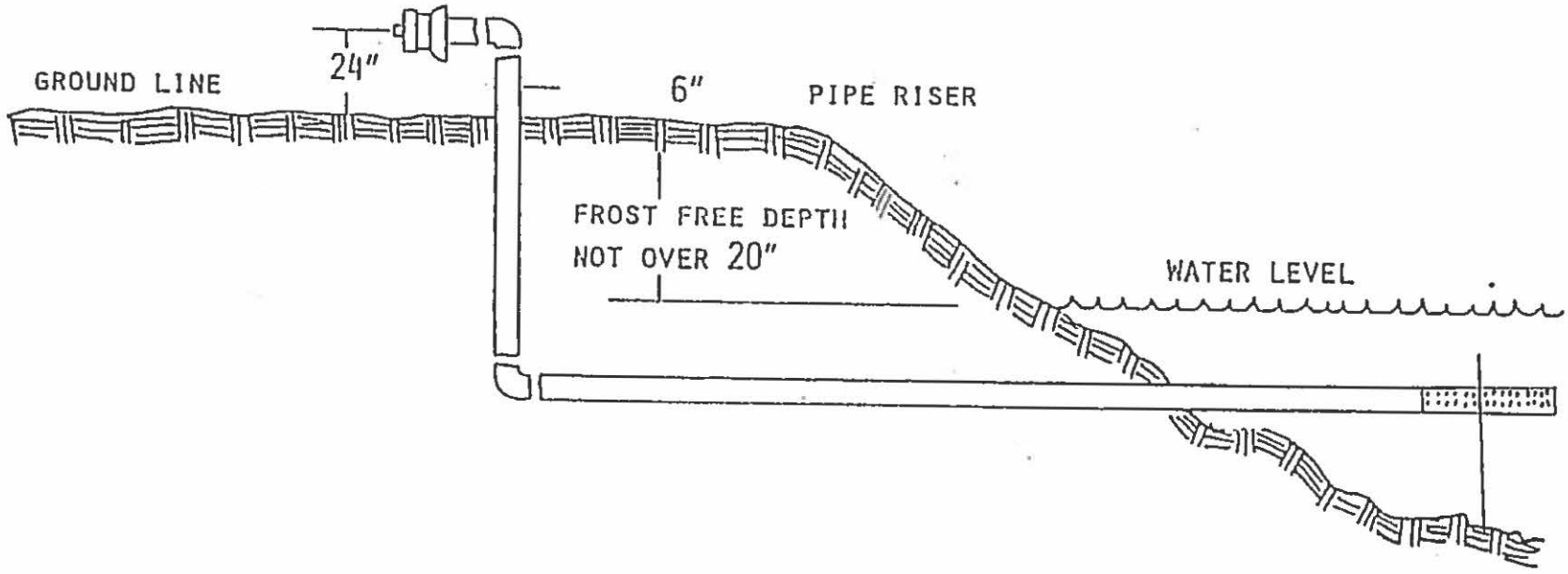
DRY HYDRANT

A PERMANENT INSTALLATION OF PIPING TO A STATIC WATER SUPPLY THAT WILL ALLOW RAPID UTILIZATION OF THAT SUPPLY BY THE FIRE DEPARTMENT REGARDLESS OF THE SEASON



Legend

- City Limits
- Usa Current
- Usa 2005 08
- Usa 2005 07
- Usa 2004 03
- Usa 2004 02
- Usa 2001 02
- Usa 2001 01
- Usa 1999 07
- Usa 1997 11
- Usa 1997 08
- Usa 1997 07
- Usa 1996 08

Note: The Urban Service Area boundaries shown here are a history of GIS interpretations of the actual boundary at different times. Some layers may be less accurate than others.

2003-2-M-003 ?
2003-2
27.03 Acres

97-1-M-05

97-1-M-011

2000-1-007?
- 34.519 Acres

Done in Feb, 2001
Area averages out.
39.780 Acres

2004-2-M-008
77.566 Acres

2000-2-M-003
Probably
1.885 Acres

99-1-M-001
-294.374 Acres

Sometime around 97 or 98
250.940 Acres
1997-1 created SE sector
this came shortly after

Parcel Line
Correction

Done 11-25-97 +-
17.211

2005-2-M-006
17.588 Acres

Woodville
Rural
Community

Urban Service Area Boundary History

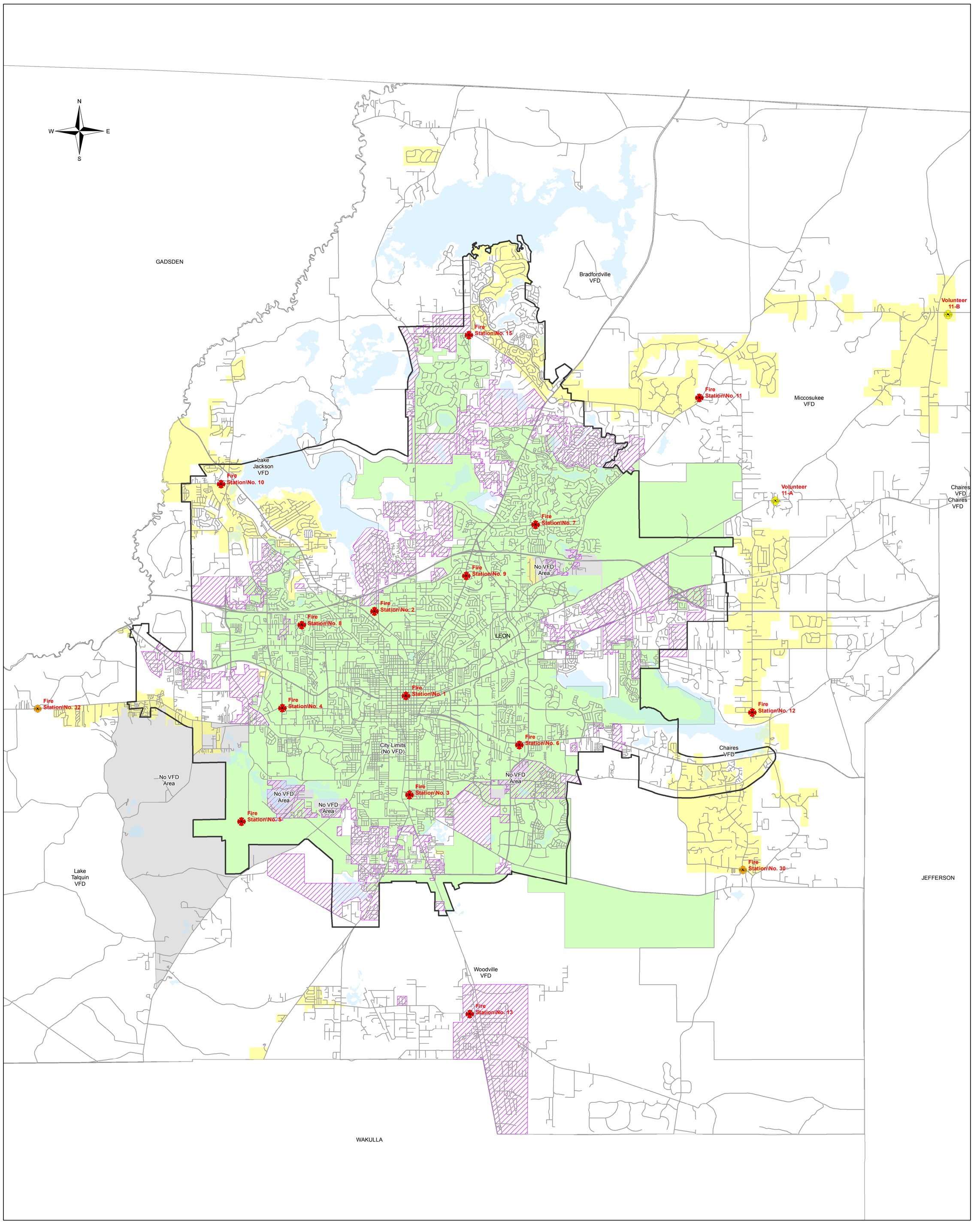
TLCPD GIS DJ Jan. 1, 2014

Public Subdivisions Platted Prior to 1990

SUBDIVISION NAME	Unit # and Year Plat Recorded									Comments
	1	2	3	4	5	6	7	8	9	
Killearn Lakes	71	72	72	73*	73					* Replatted in 78- Part of a DRI have water and FP
Golden Eagle	86	88	90		96		96			Part of KL and their DRI have water and FP
Rosehill	87									Inside City limits
Killearn Acres	69	69	69	69	69		70	70	70	Has FH's some small gaps
Hill 'n Dale Estates	58									Area 7 COT Masterplan- 2.5 million to extend
Plantation Estates	85	86	88	88	88					Area 7 COT Masterplan- 2.5 million to extend
Buck Lake Estates	81	86								COT - No FH in subdivision
Sedgefield	77	79	79	83	87					COT - No FH in subdivision
Lafayette Oaks	71									COT has water and FH
Arendell Hill	68									COT- no hydrant
Lafayette Estates	88	88	89	97						COT water a few hydrants
(The) Antlers	85									COT has hydrants
Meadow Hills	62									Private System
Avondale	87	88	89	92						COT - has water and FH's
Frontier Estates	90	91	91							COT - no FH's
Timber Lake	86									COT - has hydrants
Meadows At Woodrun	74	78	79	81	81					Talquin has a few hydrants
(The) Meadows	90	90	92	92	93					Talquin some hydrants*
Woodside Heights	55		57	59						COT - some hydrants
Yon's Lakeside Estates	41									COT - hydrants
Yon's Lakeside Addition	50	55	59							COT - hydrants
Paradise Village	74	84								COT water a few hydrants
Pine Ridge Estates	76	79	80							COT no hydrants
Towers Subdivision	57									Talquin - No hydrants*
Longwood Estates	56									COT no hydrants
Plantation Woods	78	79	81	83	84					COT some hydrants
Runnymede		69	71							Talquin -1 hydrants*
Edinburgh Estates	77	77	79	80	83	85	85			Talquin - 1 new hydrant *
Lakewood Village	72									Talquin - no hydrants*
Autumn Woods	76	77	77	78	79					Talquin - 1 hydrant*
Sterling Woods	79	81								Talquin- 6" line in part*
Lakewood Estates	80	80	83	83						Talquin- no hydrants*
Oak Valley	85									Talquin - No hydrants*
Oak Valley Estates	85	88								Talquin- No fire hydrants*

Lake Jackson Heights	53	55								Talquin- No fire hydrants*
Harbinwood Estates	62	64	69							Talquin- No fire hydrants*
Bent Tree Estates	75	76	80							Talquin- No fire hydrants*
Jackson Oaks	77		80							Talquin- No fire hydrants*
Greenwood Hills	70									Talquin- No fire hydrants*
Kirkwood	64	72								COT a few hydrants
Meridian Estates	57									COT a few hydrants
Lakeshore Estates	61	60	74	77	79	85	88			COT a few hydrants
Hawk's Nest	87									COT has hydrants
Bobbin Mill Woods	74	92	98							COT- no hydrants

City of Tallahassee and Talquin Water Utility Franchise Areas



Legend

Firestations

Entity

- CITY OWNED - CITY OCCUPIED
- COUNTY OWNED - VOLUNTEER OCCUPIED
- VOLUNTEER OWNED - VOLUNTEER OCCUPIED
- Major Lakes
- Streets
- City of Tallahassee Water Utility Franchise Area
- Talquin water Utility Franchise Area

VFD Zones

VFD Name

- Woodville VFD
- Bradfordville VFD
- Chaires VFD
- City Limits (No VFD)
- Lake Jackson VFD
- Lake Talquin VFD
- Miccosukee VFD
- No VFD Area

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0 1.75 3.5 7 Miles

City of Tallahassee Utilities
Waterline Extension Master Plan Summary

Fire Hydrant Upgrades	County - wide, Various Subdivisions - Add 400 hydrants (Autumn Woods, Woodville existing water service area	Addition of fire hydrants in existing area served where adequate distribution lines exist and hydrants need to be added for urban fire protection	2,500,000.00
Waterline Extensions to provide domestic and fire protection services:			
From COT Masterplan			
	COT Masterplan Areas	**Subdivision Description**	**Cost**
	Area 1 - N, E., and S of Lake McBride	Water to McBride Hills, McBride Estates, Water Oak, Millstone Plantation	3,500,000.00
	Area 2 - Around Lake Carolyn	Lake Carolyn Estates, Coble Farms	1,400,000.00
	Area 3 - Centre Court	Henry Robinson Way, Pemberton	780,000.00
	Area 4 & 5 - Miccosukee Greenway	To support greenway facilities & development of Welaunee	480,000.00
	Area 6 - Off Miles Johnson	Holly Terrace, Palace Place, Austin Lane	860,000.00
	Area 7 - between Mahan and I-10	Hill n dale, Plantation Estates and Lake Classic subdivisions	2,480,000.00
	Area 8 - Meadow Hills, Groveland Hills	Groveland Hills Drive, Tung Hill Drive, Meadow Hills	2,030,000.00
	Area 9 - Windward Hills, Mt. Sinai	Weeping Willow, Windward, Downhill, Mt. Sinai Rd., Haven Lane, etc.	1,400,000.00
	Area 10 - S of US 27, W of Williams, N of Old St. Augustine	Harrison Hill Way, Verdura Oaks, Ajax Rd., Verdura Way, Big red Rd., County Maintenance Rd, etc.	2,100,000.00
	Area 11 - Pine Ridge Estates	Sullivan Rd., Sand Rd., Van Delia, Jackson Bluff, etc.	1,120,000.00
	Area 12 - Aenon Woods Estates	Westview Lane, Westhaven etc.	1,320,000.00
	Area 13 - East of Barineau and N or 20	Circle C Trail, Damon Circle, Pleasant Acres MHP	480,000.00
	Area 14 - Geddie and 90 area	Mark Av, Big B Lane, Sassy Tree Lane, Messer MHP, Pleasant Acres MHP, Horseman's Association	1,850,000.00
	Area 15 - South of NW Industrial Park		260,000.00
	Area 16 - Riverwood Estates, Wildwood Autumn Pond Quail Meadow	Jamey Rd., Riverwoods, Honey Dew, Flat, Back Forty, Don Hunter, Maddox, Scawthorne, Running Meadows, etc.	3,750,000.00
	Area 17 - W of Meginnis Arm, NE of Monroe	Livingston, Fuller, etc.	690,000.00
Subtotal New Water COT Areas 1 -17			**24,000,000.00**
Water Total			**26,500,000.00**