

**WINCHESTER COMMON COUNCIL SPECIAL MEETING  
EXHIBIT HALL – ROUSS CITY HALL  
TUESDAY, APRIL 22, 2014  
AGENDA  
6:00 p.m.**

**1.0 CALL TO ORDER AND ROLL CALL**

**2.0 PUBLIC COMMENTS**

**3.0 AGENDA**

**3.1** Motion for the Nomination of \_\_\_\_\_ and \_\_\_\_\_ for re-appointment/appointment to the School Board and direct the Clerk of Council to issue a Notice of a Public Hearing for citizen comment on same in accordance with §22.1-29.1 of the Code of Virginia.

**3.2 R-2014-20:** Resolution - Endorse and authorize the funding for the Comprehensive Radio Communications Project (pages 2-17)

**4.0 ADJOURNMENT**

CITY OF WINCHESTER, VIRGINIA

PROPOSED CITY COUNCIL AGENDA ITEM

CITY COUNCIL/COMMITTEE MEETING OF: 04.22.2014 CUT OFF DATE: 04.14.2014\_

RESOLUTION \_\_\_ ORDINANCE \_\_\_ PUBLIC HEARING \_\_\_

ITEM TITLE: Comprehensive Radio Communications Project

STAFF RECOMMENDATION: Informational Purposes - Appropriate Funding to Proceed with Project

PUBLIC NOTICE AND HEARING: N/A

ADVISORY BOARD RECOMMENDATION: N/A

FUNDING DATA: Will require increase in appropriation to complete project. Mary Blowe will address the funding.

INSURANCE: N/A

The initiating Department Director will place below, in sequence of transmittal, the names of each department that must initial their review in order for this item to be placed on the City Council agenda. The Director's initials for approval or disapproval address only the readiness of the issue for Council consideration. This does not address the Director's recommendation for approval or denial of the issue.

<u>DEPARTMENT</u>	<u>INITIALS FOR APPROVAL</u>	<u>INITIALS FOR DISAPPROVAL</u>	<u>DATE</u>
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. City Attorney	<i>[Signature]</i>		4/15/2014
6. City Manager	<i>[Signature]</i>		4-16-14
7. Clerk of Council	<i>[Signature]</i>		4-16-14

Initiating Department Director's Signature: *[Signature]* 4.10.2014 Date



APPROVED AS TO FORM: *[Signature]* 4/15/2014 CITY ATTORNEY

**A RESOLUTION TO ENDORSE AND AUTHORIZE THE  
CONTINUATION, COMPLETION AND FUNDING OF THE  
COMPREHENSIVE RADIO COMMUNICATIONS PROJECT**

**WHEREAS**, the City of Winchester has embarked on a comprehensive radio communications project; and

**WHEREAS**, it has been determined that a single site, trunked, Project 25, digital system has been deemed unacceptable in accordance with FAA tower regulations; and

**WHEREAS**, research and design has identified that a two site, simulcast, trunked, Project 25, digital system will be necessary to fulfill the system's performance specifications; and

**WHEREAS**, staff members from the City, R. L. Kimball and Associates., Motorola Solutions and Teltronics have diligently worked to create an operationally functional and fiscally responsible solution; and

**WHEREAS**, the minimum performance standard of the system as designed and applied will be 95% coverage, 95% reliability with 20Db utilizing portable, handheld radios inside structures: and

**WHEREAS**, the City of Winchester is in critical need of replacing the current outdated non-compliant system; and

**WHEREAS**, the projected cost of the completed operational system is projected at \$5.4 million and will be included within the Fiscal Year 2015 budget.

**NOW THEREFORE, BE IT RESOLVED** that the Common Council of the City of Winchester hereby endorses the conceptual design of a two site, simulcast, trunked, Project 25, digital system with a cost not to exceed \$5.4 million, and

**BE IT FURTHER RESOLVED** that the Common Council hereby authorizes the City Manager to execute all documents necessary to pursue and complete the Comprehensive Radio Communication System as prescribed.

# CITY COUNCIL ACTION MEMO

**To:** Honorable Mayor and Members of City Council  
**From:** Lynn Miller, Emergency Management Coordinator  
**Date:** April 10, 2014  
**Re:** Comprehensive Radio Communications Project

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**THE ISSUE:** Review Re-engineered/designed project

**RELATIONSHIP TO STRATEGIC PLAN:** Objective 2 – Develop a High Performing Organization, Objective 4 – Create a More Livable City for All

**BACKGROUND:** See Attached

**BUDGET IMPACT:** Will require an additional appropriation to existing project budget

**OPTIONS:** Other options have been examined and determined to be inadequate and non-compliant with federal regulator issues. The presented proposal addresses the basic needs, meet performance specifications, creates compliance with regulator issues and is fiscally responsible.

**RECOMMENDATIONS:** Endorse engineering and design as presented with overall project cost not to exceed \$5.4 million.

# Comprehensive Radio Communication Project

## Executive Summary

### **Introduction:**

The following will provide insight into the City of Winchester's Comprehensive Radio Communications Project. It will provide an abbreviated review of the background and history of the project since inception, the current status, pricing information and a projected date for project conclusion. Several exhibits are attached that should provide backup data relating to the project.

### **Background:**

The Comprehensive Communication Project was initiated in 2005 consisting of a preliminary review of the current radio communications system. This review identified many deficiencies in the system including but not limited to age, overall condition of fixed network equipment and subscriber units, lack of coverage and lack of interoperability. The preliminary review resulted in a comprehensive study of the system conducted by L. R. Kimball and Associates. The purpose of this study was to fully review of the system, consult with system users to identify deficiencies and desired corrective action and to create a conceptual design of a system accompanied by estimated pricing. During the course of the study it was determined that Federal Communications Commission (FCC) regulations had been modified to require VHF radio systems to be compliant with Narrowbanding on or before January 1, 2013. The study was completed and presented to City Council in 2007. The conceptual design was based on a Trunked, Project 25, Digital System having a projected cost of between \$5 - \$6 million dollars. Following much discussion City Council authorized the crafting of an RFP for the system. The RFP was distributed in accordance with procurement statutes and responses received on February 29, 2012. Following review and discussion the RFP was presented to City Council and a contract was executed with Motorola Solutions. The system as designed was to fully comply with the performance standards contained within the RFP and address regulatory issues.

The system as specified and designed by Motorola was to consist of a Single Tower Site, Trunked, Project 25 Digital System providing 95% Reliability and 95% Coverage throughout the operational area utilizing portable handheld radios inside of structures within the 800Mhz frequency spectrum, City Council authorized the system to be installed and appropriated an expenditure not to exceed \$3.5 million. The Contract Review Design (CDR) portion of the project was initiated and particulars of the project were discussed, field testing utilizing various portable handheld radios was conducted in Hanover County utilizing a similar system as planned for the city. The project schedule was formulated projecting completion during early spring of 2014. While CDR was being conducted other elements of the project were progressing simultaneously including but not limited to licensing, finalization of tower site design, Federal Aviation Administration (FAA) pertaining to the position and erection of the tower on Jefferson Street, FCC variance relating to the Narrowbanding compliance issue and other items.

The Conditional Use Permit (CUP) application for the 250' tower was filed with the Zoning and Inspections Department and was presented to the Planning Commission during a work session on Tuesday August 13, 2013 and addressed at the regular meeting of the Planning Commission on August 20, 2013. The Planning Commission with some reservation approved the installation of the tower at the Jefferson Street site although several comments objecting to the tower were received during the public comment period of both meetings. The CUP was then scheduled for presentation during the August 27, 2013 City Council Work Session. During this meeting several comments registering objections were received from the public. At this time a favorable ruling had not yet been received from the FAA. Council action moved the CUP forward to the September 10, 2013 Council meeting. During the September 10, 2013 meeting City Council tabled the CUP application and requested staff to review other options. Alternate sites were examined and were determined not to be feasible either operationally or fiscally appropriate. The CUP was included in the December 10, 2013 Council Agenda for consideration and action by Council. Literally in the eleventh hour the City was notified by the FAA that a favorable ruling would not be issued by the FAA relating to the tower. As explained by the FAA representative

the lack of a favorable ruling was the result of a concern expressed by the Winchester Regional Airport Manager as the erection of the tower would create a hazard to aviation as the structure would protrude into the Minimum Decent Altitude (MDA) for circling aircraft staging to land at the airport. Additionally, regulations relating to MDA had been issued by the FAA during May of 2013 which reduced the MDA as related to the airport. Based on this information the item was not addressed by Council. The lack of a favorable ruling by the FAA basically precluded the 250' tower from consideration and an alternate plan of action would be necessary.

The communications implementation committee in concert with the City's consulting firm (R. L. Kimball & Assoc.) and Motorola Solutions initiated research into an alternate plan. It was identified that the alternate plan must comply with the performance standards as specified in the RFP, must meet regulatory issues, be compatible with the needs of the users and be fiscally responsible. The research was to consider all notable technologies, additional tower sites whether new, existing or leased space, provide a long term solution to the radio communication situation and be community and fiscally responsible.

### **Solution:**

Following a great deal of research and discussion the communications implementation committee including the consulting firm and Motorola Solutions arrived at a viable solution that addressed all of the required criteria. The proposed system will utilize two sites in lieu of a single site. Each of the sites is owned by the City and will provide sufficient area and resources to permit the project to be initiated and completed in accordance with the performance specifications. The following addresses the revised conceptual design.

- **System Design** – System is a Two Site, Simulcast, Trunked, Project 25, Digital System utilizing the 800Mhz frequency spectrum
- **Performance Specifications** – System is designed to fully comply with the performance specifications of 95% - 95% with 20 dB in building utilizing portable hand held radios
- **Sites** – System will utilize two (2) sites; the primary site is planned to be located at the Timbrook Public Safety Center while the second site will be located at the Utilities Compound located at 700 Jefferson Street
  - **Timbrook Public Safety Center** – The existing communication tower located to the rear of the building will be dismantled and replaced with a 140' Monopole structure having a 10' antenna on the top and an array of antennas located vertically on the monopole. The Zoning at the Timbrook site is B1 permitting a maximum structure height of 100'. The 100' height will not provide micro wave connectivity to the Jefferson site thus the need for the 140' monopole zoned for 150'. The project team will submit an application to the Zoning Board of Appeals for a variance permitting the 150' overall structure height. As the City owns the property in all directions from the tower site there is no impact relating to fall zone. Also, as this is a business district and it is replacing an existing tower there should be little or no impact relating to the surrounding area. The proposed tower has been submitted to the FAA for review and has met with a favorable ruling and does not provide a hazard to aviation. The tower will not require illumination or painting to meet FAA standards.  
The equipment will be located within the Timbrook structure in a secure area located on the ground level. This will eliminate the need for an exterior structure to house the equipment as building utilities will be utilized.  
The utilization of the Timbrook site eliminates the need for a new external shelter and supporting backup power equipment creating a substantial cost savings.

- **Jefferson Street, Utilities Compound** – The Jefferson Street site continues to be a vital location as related to the overall project due to the geographical location and elevation. However, based on two (2) sites the overall height of the antennas can be reduced and the performance specification achieved. The preferred design is to utilize the existing elevated tank to mount the antennas and place a prefabricated shelter at the base of the tank to house the required equipment. The really good news is there will be minor modification in the appearance of the tank. As the tank is an existing structure with an overall height of 182’ and there is no modification in the height the existing ruling of the FAA is applicable. The existing antenna array located on the tank will be removed and a new antenna array serving the new system installed. The new array will incorporate three additional antennas. In essence this is simply the replacement of the existing antennas. Issues related to a fall zone are not applicable.

As mentioned this is the preferred design, however the installation of new antennas will require a structural analysis of the elevated tank be performed as the method of mounting will be different from the existing. Should the structural analysis determine the tank cannot support the antenna array the alternate will be to erect a 174’ self supporting tower on the site. Should this be necessary due to the 174’ height the FAA requirement to illuminate and/or paint aviation orange and white will not be applicable. Additionally, as the overall height of the tower has been reduced the issue of a fall zone will have been eliminated.

- **Schedule** -The project based on the conceptual two site design is scheduled for completion no later than October 1, 2015. The schedule is extremely ambitious but through discussions with the contractor and the internal implementation team it is their opinion this schedule can be met.
- **Budgetary Impact** – Due to the necessity to revise the initial single site design in lieu of a two site design the proposed budget for the project has increased from the proposed \$3.5m to a maximum of \$5.4. This includes all aspects of the project including professional services, electrical and bonding corrective actions, etc. Each of these items is identified on Exhibit 5 as attached. Although the cost exceeds the cost of \$3.5m for a single site system I am pleased with the performance of the overall team performance and the ability to hold the pricing to this level. The input and overall cooperation between the internal team, consulting services and Motorola Solutions have provided a pricing format similar in nature to that presented to City Council during 2007. The original conceptual design for a multi site system as submitted by the consulting firm indicated a price range of between \$5m - \$6m and a projected 10% increase per year. The current design and pricing is at the lower end of the originally projected range.
- **Exhibits** – The following exhibits have been attached to provide additional data relating to the project.
  - Exhibit 1 - Propagation Studies relating to 800 Mhz Simulcast, Two Site, Trunked, Project 25 Digital Radio System:
    - 1A – Portable Roundtrip Coverage, Two Site, Radio Worn on Hip w/Swivel Case and RSM 20dB Building Loss over entire Service Area.

- Exhibit 2 – Potential Tower Site Considerations – Identifies potential tower sites that were considered for a single and multi site system and information relating to each sites that was considered in the selection process.
- Exhibit 3 - Proposed mounting design pertaining to Elevated Tank located at 700 Jefferson Street, Utilities Compound
- Exhibit 4 - Motorola Solutions Pricing Summary
- Exhibit 5 - Project Pricing Sheet including all pricing information and itemization of each component.

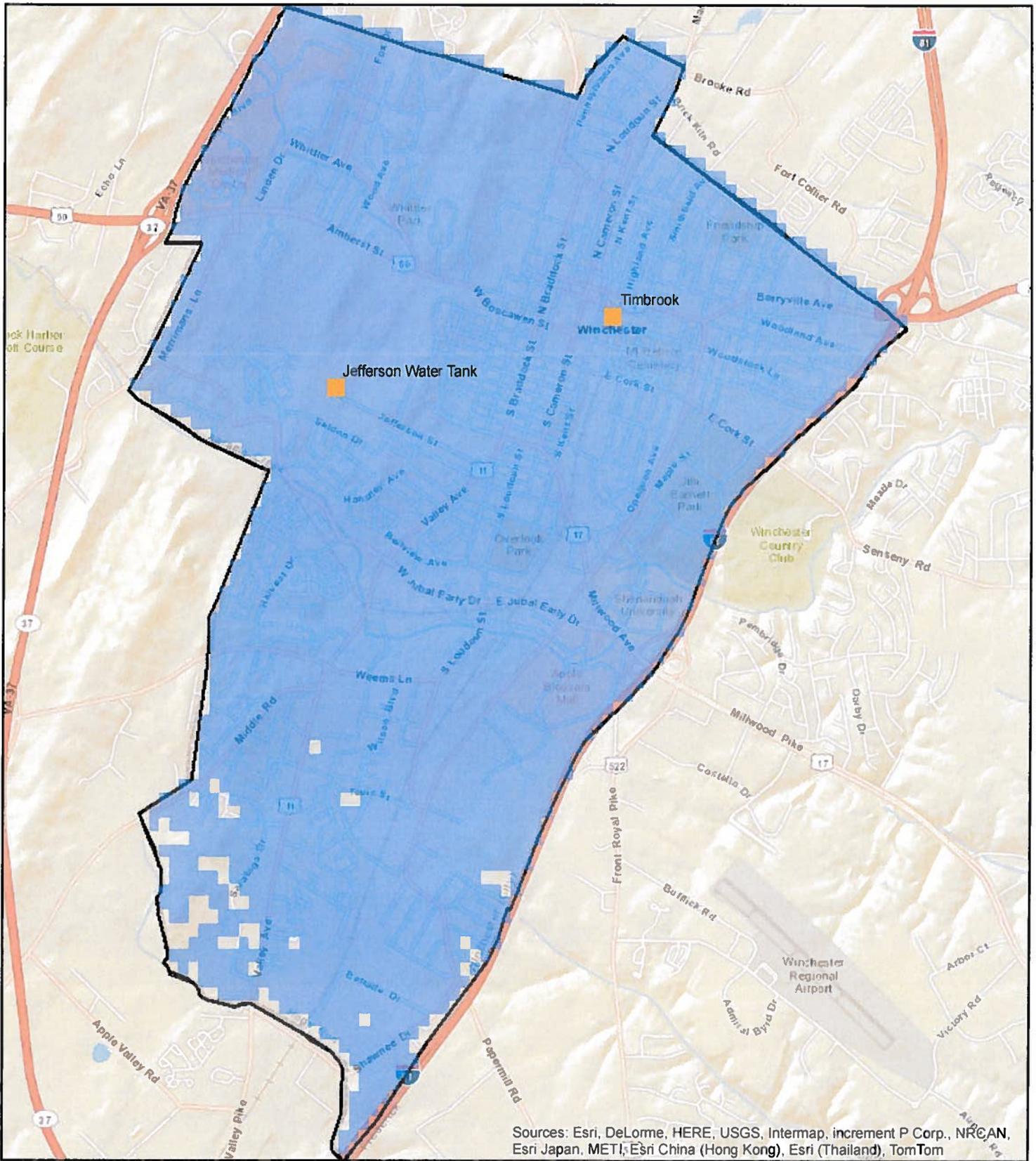
**Summary:**

The Comprehensive Radio Communication Project is a vital element of Public Safety Operations as well as day to day operations of all city entities. The current system is antiquated in relationship to the fixed network equipment (FNE), subscriber equipment (portable/handheld) and all associated equipment. The system is undependable, in some cases non-repairable, is not interoperable and creates an inherent danger to the users and the public. Additionally, the city is presently utilizing the existing system through a waiver from the FCC in relationship to Narrowbanding regulations. The waiver was originally granted during 2012 based on a petition prepared and submitted by the City. The original waiver expired January 1, 2014 and an extension of the waiver was requested and granted through December 31, 2014. The FCC also informed the City on April 9, 2014 that the licenses issued to the City for the 800Mhz frequency spectrum were in jeopardy of being revoked as the construction/compliance build out of between June/July of 2014 would not be completed. The FCC afforded the City the opportunity to request an extension of the construction/compliance period. The extension request was completed and submitted on April 9, 2014 and receipt of such confirmed by the FCC. Although it is anticipated the extension will be granted we have not yet received notification.

I respectfully recommend City Council consider the overall positive impact to safety and service delivery derived from a comprehensive radio communications system and endorse the program authorizing the additional funding necessary to move the project forward.

Should members of Council have questions members of the project team are present and available for comment.

**2 Site Digital 800MHz ASTRO Voice Simulcast System w/TTA - DAQ 3.4**



Sources: Esri, DeLorme, HERE, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom

0 0.125 0.25 0.5 Miles

1 inch = 0.57 miles

**Portable Roundtrip Coverage, Radio Worn on Hip w/ Swivel Case and RSM  
20dB Building Loss Over Entire Service Area**

## Winchester Tower Site Selection Justification Matrix

Site, Address	Ranking	Tower New/Existing	Tower Height	Tower TCO	Zoning Height Restricted	Ground Space Avail	Comm. Shelter Reqd	New Generator Required	Meets Coverage Requirement	MW Path Available	FAA Approved
Coordinates		Availability		(10 year)	Var Reqd	(City Owned)				(to site)	
<b>Single Site System</b>											
Utilities Dept (Compound) 700 Jefferson Street 39°-10'-49" N 78°-11"-01" W	Not Acceptable (FAA)	New	250'	\$394,646 Proposed Cost	EIP No Max Height - Educational, Institutional, Public	Yes  (City Owned)	Yes	Yes	Yes	Yes  (Timbrook)	No
National Fruit Products (Shentel) 799 Fairmont Ave. 39°-19'-92" N 78°-16'-92" W	Not Acceptable	Existing  Not available	180'	\$240,000*  Lease	M1	Yes	Yes	Yes	No	Unknown  (Timbrook)	Yes
Timbrook Public Safety Center  231 E. Piccadilly Str. 39°-11'-10" N 78°-09'-35" W	Not Acceptable	New	350'	\$605,000  Purchase	B1 Max. Height 100' Variance Required	Yes  (City Owned)	NO	NO	Yes	N/A	Yes
Winchester Medical Center  1840 Amherst Stre 39°-12'-01" N 78°-11'-04" W	Not Acceptable (tower ht)	New	450'	\$778,910  Purchase	TBD	Yes	Yes	Yes	Yes	Yes  (Timbrook)	TBD (FCC applic)

## Winchester Tower Site Selection Justification Matrix

Site, Address	Ranking	Tower New/Existing	Tower Height	Tower TCO	Zoning Height Restricted	Ground Space Avail	Comm. Shelter Req'd	New Generator Required	Meets Coverage Requirement	MW Path Available	FAA Approved
Coordinates		Availability		(10 year)	Var Req'd	(City Owned)				(to site)	
<b>Multiple Site System</b>											
700 Jefferson St -Option #1 (Elevated Water Tank)	1	Existing	182'	Existing (no cap exp)	EIP No Max. Height	Yes	Yes	Yes	Yes @ 2-site system (with Timbrook)	Yes (Timbrook)	Yes
39°-10'-49" N 78°-11'-01" W			(tip)		FAA 182' AGL FAA 1052 AMSL	(City Owned)					
700 Jefferson St -Option #2 (New Tower)	2	New	182'	\$351,205	EIP - No Max. Height	Yes	Yes	Yes	Yes @ 2-site system (with Timbrook)	Yes (Timbrook)	Yes (pending)
39°-10'-49" N 78°-11'-01" W			(tip)	Purchase	FAA 1052 AMSL	(City Owned)					
Timbrook Public Safety Center (New Monopole)	1	New	150'	\$286,405	B-1 Max. Height 100'	Yes	NO	NO	Yes @ 2-site system (with Jefferson)	Yes (Jefferson)	Yes
231 E. Piccadilly St 39°-11'-10" N 78°-09'-35" W			(tip)	Purchase	Variance Req'd.	(City Owned)					
Frederick Douglas Park 798 N. Kent Street	Low (poor location)	New	TBD (per cvg)	N/A	EIP No Max. Height	Yes	Yes	Yes	TBD - Utilize as 2nd or 3rd site. Coverage Northern Area Would not allow coverage southern area	TBD (Path Analysis Required)	TBD (applic)
39°-11'-30" N 78°-09'-23" W						(City Owned)					
Friendship Fire Company 627 N. Pleasant Valley Rd.	Low	New	TBD (per cvg)	N/A	EIP No Max. Height	Yes	Yes	Yes	TBD - Utilize as 2nd or 3rd site. Coverage Northern Area Would not allow coverage southern area without 3rd site	TBD (Path Analysis Required)	TBD (applic)
30°-11'-30" N 78°-09'-23" W											

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*Exhibit 2*

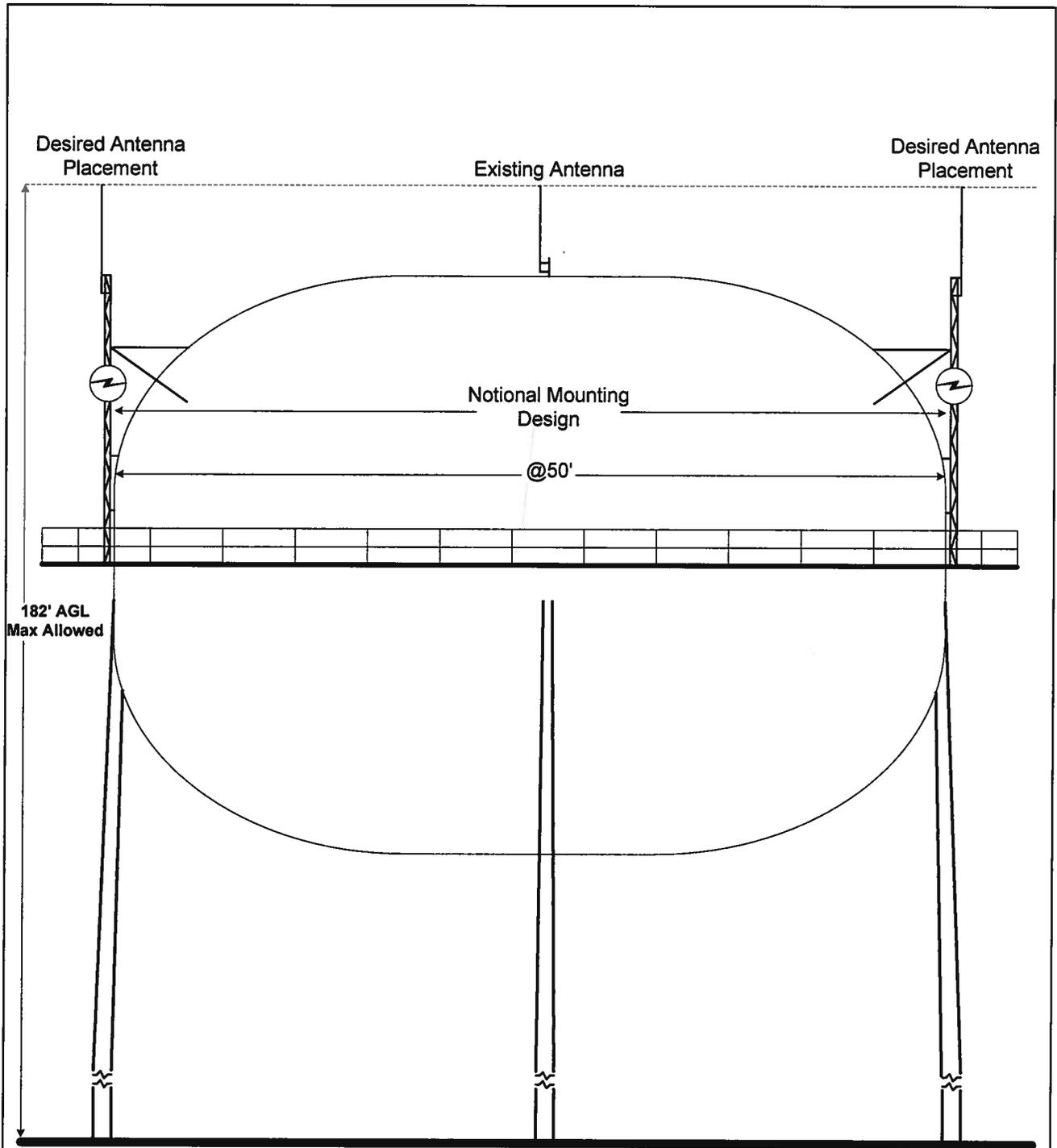
## Winchester Tower Site Selection Justification Matrix

Site, Address Coordinates	Ranking	Tower New/Existing Availability	Tower Height	Tower TCO (10 year)	Zoning Height Restricted Var Reqd	Ground Space Avail (City Owned)	Comm. Shelter Reqd	New Generator Required	Meets Coverage Requirement	MW Path Available (to site)	FAA Approved
National Fruit Products (Shentel) 799 Fairmont Ave. 39°-19'-92" N 78°-16'-92" W	Low	Existing No Available Space	180'	\$240,000*	M-1 Max. Height 200'	TBD	Yes	Yes	TBD - Utilize as 2nd or 3rd site. Coverage northern area would not allow coverage southern area without 3rd site	TBD (Path Analysis Required)	Yes
WINC Radio 520 N. Pleasant Valley Rd. 39°-11'-15" N 78°-09'-10" W	Low	Existing Available Space Unknown	150' (ASR)	\$240,000*  Lease	MR - Med. Density Max. Height 75'	TBD	Yes	Yes	TBD - Utilize as 3rd site. Coverage northern area would not allow coverage southern area utilizing only Timbrook	TBD (Path Analysis Required)	Yes
South End Fire Co. 17 W. Monmouth Street 39°-10'-43" N 78°-10'-06" W	Low	New (proposed cell tower)	TBD (zoning)	\$240,000*  (if leased)	RB-1 Max. Height 75'. Within Historical District, Requires BAR Review	TBD	Yes	Yes	TBD - Utilize as 2nd site. Coverage southern area not acceptable	TBD (Path Analysis Required)	TBD (applic)
Shawnee Fire Co. 2210 Valor Drive 39°-09'-36" N 78°-10'-50" W	Low	New	TBD (per cvg)	\$240,000*  (if leased)	B-2 Hightway Commercial. Max. Height 100'	TBD	Yes	Yes	TBD - Coverage as 2nd site southern area. Central area questionable w/out 3rd site.	TBD (Path Analysis Required)	TBD (applic)

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*Exhibit 2*





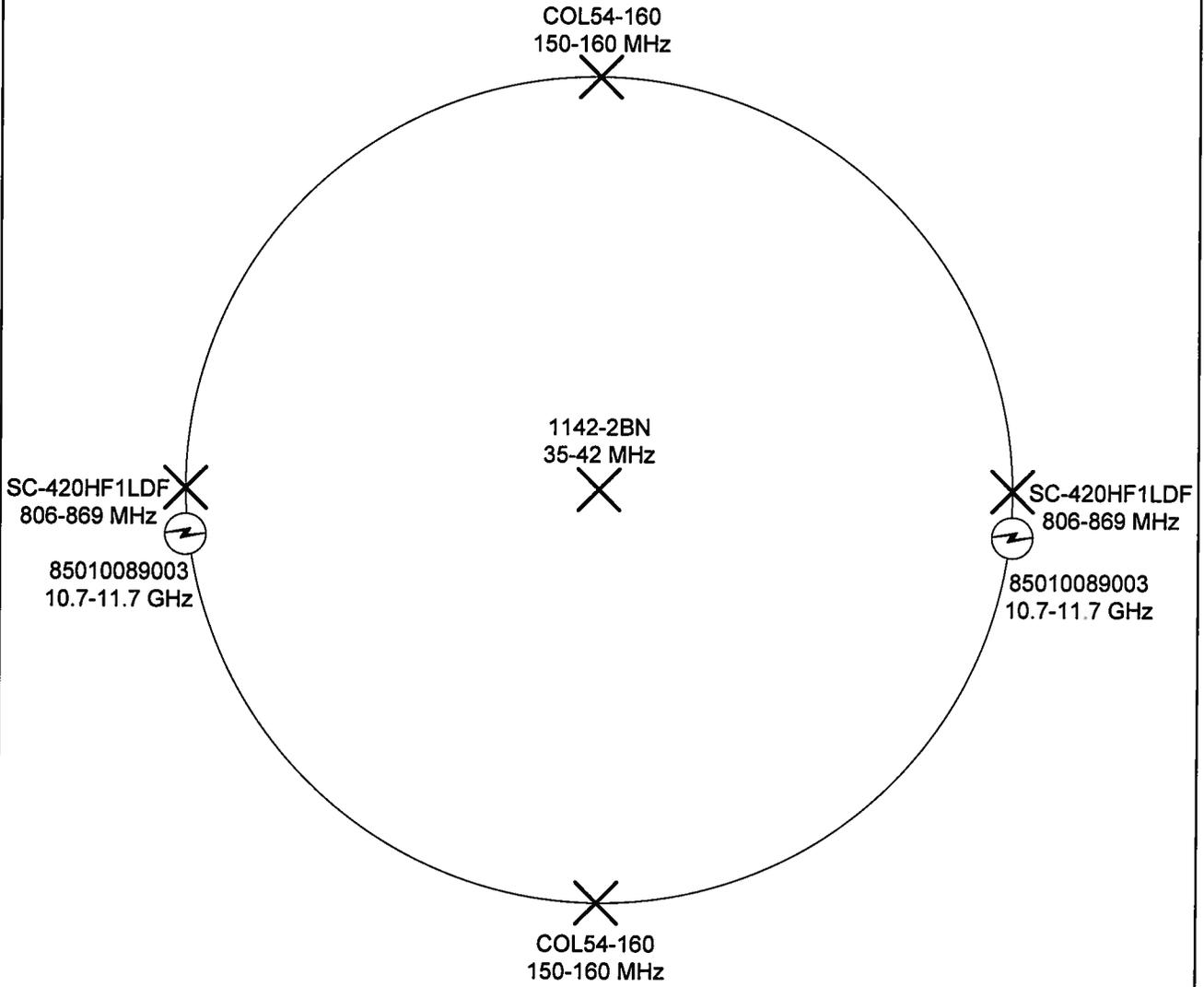
There will be a total of seven antennas on the tank.

- Qty. 2 SC-420HF1LDF
- Qty. 2 COL54-160
- Qty. 1 1142-2BN
- QTY. 2 85010089003

 = 2.6' Antenna Dish

<b>Teltronic</b>		7051 Muirkirk Meadows Dr Beltsville, MD 20705 (301)468-6500	
DESCRIPTION			
City of Winchester Jefferson Street Elevated Water Tank Desired Antenna Placement			
ENGINEER	DRAWN BY	REVISED	REV
	MARK.SCHROEDER	03/11/14	A
FILENAME	SCALE		SIZE
Antenna Placement on Tank	NONE		A

View from top of tank  
looking down to represent  
antenna placement



There will be a total of  
seven antennas on the  
tank.

- Qty. 2 SC-420HF1LDF  
806-869 MHz
- Qty. 2 COL54-160  
150-160 MHz
- Qty. 1 1142-2BN  
35-42 MHz
- Qty. 2 85010089003  
10.7-11.7 GHz

 = 2.6' Dish 10.7-11.7 GHz

<b>Teltronic</b>		7051 Muirkirk Meadows Dr Beltsville, MD 20705 (301)468-6500	
DESCRIPTION			
City of Winchester Jefferson Street Elevated Water Tank Desired Antenna Placement			
ENGINEER	DRAWN BY	REVISED	REV
	MARK.SCHROEDER	03/11/14	A
FILENAME	SCALE	SIZE	
Antenna Placement on Tank	NONE	A	



## COMPREHENSIVE COMMUNICATION PROJECT PRICING

<b>Motorola (Utilizing Elevated Tank)</b>	<b>\$4,174,560.02</b>	
<b>L. R. Kimball (Engineering/Design)</b>	<b>155,483.00</b>	
<b>Consolidated Electric (Timbrook Elec. &amp; Bond.)</b>	<b>40,000.00</b>	
<b>HVAC (Engineering &amp; Install)</b>	<b>30,000.00</b>	
<b>UPS Replacement</b>	<b>50,000.00</b>	
<b>Elevated Tank Maintenance</b>	<u>          ?</u>	
	<b>\$ 4,450,043.00</b>	
<b>174' Unsupported Tower</b>	<u>          351,205.00</u>	
	<b>\$ 4,801,248.00</b>	<b>Sub Total</b>
<b>Elevated Tank Credit</b>	<u>(          ?          )</u>	
<b>Contingencies</b>	<u>          445,000.00</u>	
	<b>\$5,246,496.00</b>	<b>Total</b>