MCIS, Inc.
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www.mciszone.com

City of Columbus, OH
Neighborhood Safety Camera Project
System Assessment and Performance
#P6197984-02

DATE: January 9, 2020

PROPOSAL FOR: City of Columbus, OH (Client)
Attention: Bob Stewart

MCIS, Inc. sincerely appreciates the opportunity of continued support to the City of Columbus, OH (City) Neighborhood Safety Camera project (NSC).

As background supporting this project, the City of Columbus manages the Neighborhood Safety Camera Project consisting of wireless communications, cameras, networks, and associated infrastructure deployed across multiple neighborhoods and the downtown area (see attachment #2). It is recognized that the system has evolved, continues to expand, aged and is experiencing unacceptable performance. This resulted in the necessity to take corrective measures that establishes performance and standards based on the original design and initial deployment. Establishing system performance and a performance base-line is necessary and prepares the existing system for near term system expansion.

In preparation of this proposal, MCIS has reviewed the available information, performed preliminary site reviews to assess condition of the NSC system (see attachment #4) and considered the City's observations.

This review identified a need to address performance issues at a system wide level, resulting in this proposal to assess the current installation and take corrective measures to re-establish system performance. Additionally, there is an identified need to establish a method and process to maintain system performance (monitoring, maintenance and predictive action) in an on-going manner. Subsequent to this effort, further consideration for performance maintenance and management may be considered based on the base line established in this effort.

Based on our review of available information relative to the scope of this proposal, the following approximates NSC system:

• Physical deployment sites:	Greater than 90 sites	(see Attachment #2)
• Microwave Radios:	Greater than 200 radios	(see Attachment #3)
• Unique microwave links:	Greater than 100 links	(see Attachment #3)
• CCTV Cameras:	Greater than 500 cameras	
• Site configuration types:	Poles, Towers, Roof Tops	

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The intent of this proposal is to provide the appropriate engineering, field services and performance management within the existing system as installed to achieve the following objectives:

1. Deliver a well-documented and performing wireless communication system.
2. Provide field services, maintenance and corrective action to achieve system performance.
3. Prepare the existing wireless NSC system for expansion via documentation, system parameters and a performance base line that supports future integration of new equipment.
4. Institute a performance analytics & monitoring program to facilitate sustainable performance within the existing system and future expansions.

The Pilot Phase commenced in late 2011 and the last expansion phase was completed in 2016. With many devices approaching a decade of service and the requirement for system performance, MCIS proposes the following Scope of Work:

Preliminary System Evaluation and Performance Assessment

MCIS will assess and evaluate all data available for each site during the design/engineering phase through system commissioning, since project inception. This data will be the basis for establishing the design metrics of the system. These metrics are used to establish appropriate metrics for on-going performance. Measurable metrics demonstrate performance, provide indication of declining performance relative to the communication system and facilitate tracking against an acceptable base-line.

The general data to be assessed and evaluated includes the following:

1. System design and performance requirements established by, and in conjunction with the City.
2. Document existing equipment make/model, configurations, firmware, performance capabilities, and quantities utilized at each site.
3. Assess wireless engineering requirements to deliver robust communication between sites.
4. Review CCTV enclosure housings, components, cable and devices.
5. Assess existing device configuration settings, frequency utilization, and signal strengths.
6. Identify specific equipment, material and aging.

This assessment will be completed by one (1) MCIS System/Network Engineer and assumes fourteen (14) business days to complete. The documentation and assessment shall be reviewed with the City and incorporated into the performance assessment deliverable.

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Site Assessment and Documentation - Baseline

MCIS will perform a physical inspection and diagnostic assessment of each NSC site supporting the wireless system. The scope of this work is to assess, validate, and document each site resulting in specific field and configuration actions to deliver a base-line for appropriate configuration, quality of system installation and appropriate performance. The following information outlines the scope for the assessment and documentation:

1. Validate and document site locations (i.e. address, location, GPS coordinates).
2. Physical inspection and documentation of mounting infrastructure, alignment, obstructions and equipment (pole, mounts, mast, radio, CCTV enclosure, cabling, electrical, overall condition).
3. Equipment documentation (quantity and type of radios, radio configuration/firmware, CCTV's, switch, power supplies, abandoned devices, overall condition of enclosure and network devices).
4. Identify, document and recommend material and/or equipment needed to achieve an appropriate installation and system performance.
5. Coordinate with City to facilitate remote access to wireless and CCTV devices to perform spectrum analyses, record current RF interference levels, document device configurations, radio frequency, signal strengths, video quality, frame rates, etc.
6. Provide recommendations and/or requirements to achieve system performance in a comprehensive deliverable.

This phase for site work and documentation will be completed by one (1) MCIS System/Network Engineer and one (1) Wireless Technician and assumes a minimum of fourteen (14) business days to complete. The assessment shall be reviewed with the City and incorporated into the Site Assessment and Documentation deliverable.

System Performance

This phase of the project will deliver technical and labor services to achieve wireless performance of the NSC system. Utilizing the data collected during the preliminary and site assessment phases, MCIS will perform the following work as part of this effort:

1. Replace damaged/defective/inconsistent/non-functional devices and/or components based on the evaluation, assessment and documentation. Cost associated with equipment replacement shall be within the budgetary allocation (see "Budgetary Costs, Equipment, Materials, Supplies") and adjusted via change orders where budgetary costs are exceeded.
2. Where new equipment is required, equipment will be bench tested and configured prior to deployment to validate functionality and performance.

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3. Perform spectrum analyses at each site using the radio's built in spectrum analyzer and/or external spectrum analysis to compare with previously collected data, establish a baseline and document the RF environment.
4. Perform corrective actions to achieve installation quality, field test continuity of new communication cables and document the installation.
5. Align antennas, achieve appropriate signal strengths, and record results.
6. Validate CCTV settings against engineering requirements for wireless backhaul.
7. Validate video quality and functionality of CCTV's at each point of demarcation (i.e. wireless interface with hardwired network switches). This procedure shall be accomplished by connecting directly to the point of demarcation and logging directly into each camera via wireless link and browser interfaces.
8. Perform acceptance testing and performance validation. This, at the City's request, shall be completed by MCIS and in the presence of authorized City personnel at the conclusion of this phase. Acceptance documentation shall be approved by both parties at the conclusion and included in the System Performance deliverable. Acceptance testing and system performance verification beyond the NSC project demarcation sites (i.e. within the City's network) is not included or assumed by MCIS, as part of this effort.

This phase for site work and documentation will be completed by one (1) MCIS System/Network Engineer, one (1) Senior Technician, and two (2) Wireless Technicians, and assumes a minimum of ninety (90) business days to complete. The data shall be incorporated into the System Performance deliverable.

Budgetary Costs, Equipment, Materials, Supplies:

MCIS shall include a budgetary cost for equipment, materials and supplies required to achieve performance of the NSC system. All costs for equipment and supplies shall be tracked with associated receipts for re-imbursement. Where budgetary estimates differ from actual, an appropriate change order shall be initiated. Each device repaired or replaced shall be documented and include receipts for the City's records. A Bill of Materials shall be provided to the City within 10 days of completion of the Site Assessment and Evaluation phase. Should any devices and/or equipment fail or become damaged after the site assessment, MCIS will notify the Client and provide a Change Order directive to complete the repairs/replacement.

Final Reporting and Documentation

Upon completion of acceptance testing, MCIS shall compile the data collected and develop performance metrics for inclusion in a comprehensive deliverable for the City of Columbus, OH. The preliminary documentation shall be delivered to the City within (10) days after completion of assessment. MCIS assumes thirty (30) business days to complete the final deliverable, upon project completion of the assessment, field work and review with the City.

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PROPOSED PROJECT COSTING

Preliminary Assessment and Evaluation	$ 10,000.00
On-Site Assessment and Documentation	$ 25,000.00
On-Site System Performance Actions (Field Work & Documentation)	$225,000.00
Budgetary Costs – Equipment, Materials, and Supplies (change order if greater)	$ 25,000.00
Final Report, Processes, Documentation, and Review	$ 20,000.00
Special Duty Police Officer	$ 10,000.00

TOTAL PROJECT COST: $315,000.00 (estimated)

We are available to review the scope, cost, and timing at your convenience.

Assumptions:

1. It is assumed Client will handle any permitting required. No vehicle permits or any other type of permits to perform the work as outlined herein has been assumed.
2. Any work requested by Client that is outside of this Scope shall be billed at the hourly rate(s) per MCIS' 2019 Professional Fee Schedule (See attachment #1).
3. Client shall provide MCIS with access to the poles, roofs, shelters, towers, and network rooms where the radios and/or power injectors are mounted and other areas as needed to support the scope of work.
4. Client shall facilitate authorization for remote access into and across the wireless network and attached components.
5. This price assumes no new hardware, material, or supplies beyond the budgetary amount.
6. This price does not include new sites or relocation of existing sites.
7. This price assumes no performance bond will be required.
8. MCIS is not responsible for Force Majeure events causing damage or delays and no repair, correction, or replacement for such events is covered under this maintenance contract. Force Majeure is defined as any unforeseeable or unpreventable event beyond the reasonable control and without gross negligence of the party alleging its occurrence, which, despite all reasonable efforts such party to prevent its occurrence or mitigate its effects, causes a delay or disruption in the performance of any obligation imposed on such a party hereunder. Subject to the foregoing, Force Majeure shall include but not be limited to: acts of god; meteorological or atmospheric conditions; interference from new or existing sources; explosions; fires; storms; floods; lightning; system emergencies; terrorism; vandalism; any Force Majeure event described in the foregoing clauses that

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affects the performance of any person that is party to any material services; and any events that are deemed to be Force Majeure events under applicable law.

9. Pricing included herein assumes no sales tax.

TERMS AND CONDITIONS

This proposal and quotation is based on MCIS performing the entire scope of work as outlined above. Price assumes non-congested access to towers, buildings and cabling. Contingencies also include delays for inclement weather. If any additional electrical or mechanical defects due to lightning damage or other types of damage are found during maintenance, these issues will be brought to Client's immediate attention.

FEE AND TERM OF CONTRACT

This proposal is valid for 30 calendar days from the date listed on this proposal. The above work will be provided for the CLIENT. Work for this project will begin in accordance to the schedule discussed herein for the above provided price(s). Pricing does not include any applicable sales tax. Payment terms are net 30 days.

MCIS represents and warrants that it is acting as an independent contractor, and none of its personnel shall be employees of CLIENT. MCIS will be responsible for all taxes, benefits and insurance pertaining to its personnel. MCIS shall not be an agent for CLIENT or hold itself as an agent for CLIENT and shall not have the authority or power to enter into any contract, make any purchase for or otherwise obligate CLIENT in any manner.

CONFIDENTIALITY

Any non-public information relating to the Client or its business will be kept confidential by MCIS.

MCIS, Inc.	**Client**
By: _____	By: _____
Paul D. Gates CEO & President	
Date: 1/9/2020	Date: _____

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Attachment 1 - Professional Fee Schedule
Effective January 1, 2019

I. GENERAL
MCIS Inc. will provide services in accordance with the following fee schedule. Should you have any questions or require further details, please give us a call.

		Standard
II.	SENIOR SYSTEM & NETWORK ENGINEERS	$150/hour
III.	PROJECT, NETWORK, SYSTEM ENGINEERS	$125/hour
IV.	TOWER CLIMBING	$85/hour
V.	WIRELESS TECHNICIANS	$70/hour
VI.	CAD DRAFTING & FIELD TECH	$60/hour
VII.	OFFICE SUPPORT STAFF	$40/hour

VIII. EXPENSES AND CONSIDERATIONS
- A. Overtime rate is 1½ times the regular hourly rate.
- B. Premium rate is 2 times the regular hourly rate.
- C. Field service over 8 hours per day and Saturdays will be billed at the overtime-hourly rate. Sundays, Holidays, and Emergency Call-Outs will be billed at the premium rate.
- D. All expenses will be billed at cost unless otherwise specified.
- E. Domestic air travel will be coach class; international travel will be business class.
- F. Daily rates are for one 8-hour day.
- G. Consultants' time includes travel time to and from the MCIS office in Lakeland, FL
- H. All payments will be paid to MCIS Inc., net 30 days unless otherwise specified.
- I. All car mileage will be charged at $0.565/mile.
- J. Billing of the contract will occur on a pro-rata monthly basis, including all expenses unless otherwise specified.
- K. All rates subject to change without notice.

IX. FIRM CONTRACTS
- A. MCIS will provide fixed fee bids for any jobs having a clearly defined scope or work definition.

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ATTACHEMENT #2 – Partial list of sites

Weinland Park Elementry	Duxberry Ave & Cleveland Ave	E livingston Ave & Bullen Ave
E 8th Ave & N4th St	Duxberry Ave Between Medina Ave & Dresden St	Ann St & Forest St
E 8th Ave & Idianola Ave	E Long St & Hamilton Ave	E Whittier Between Oakwood Ave & WIlsonAve
E 11th Ave & N High St	E Long St & N Garfield Ave	Smith Rd & Lockbourne Rd
E 11th Ave & N 4th St	E Long St & N Monroe St	Broad St Between S Richardson Ave & S Terrace Ave
Peters Alley	E Long St & N 20th St	Broad St & S Wheatland Ave
E 7th Ave & Francess Pl	E Long St & Governors Pl	Broad St & S Wayne Ave
E 7th Ave & N High St	Mt Vernon Ave & N Monroe Ave	Broad St & S Highland Ave
W 10th Ave & N High St	Mt Vernon Ave & N 20th St	Sullivant Ave & S Warren Ave
E 8th Ave & N high St	Mt Vernon Ave & Graham St	Sullivant Ave Between S Richardson Ave & S Terrace Ave
W 8th Ave & N High St	Mt Vernon Ave & Champion Ave	Sullivant Ave & S Wayne Ave
E 11th Ave & Hamlet St	Oak St & Wilson Ave	Sullivant Ave & S Highland Ave
E 5th Ave & Peters Ave	Mt Vernon Ave & Miami Ave	Sullivant Ave & Clarendon Ave
E 5th Ave & Cleveland Ave	E Broad St Between S 9th St & S Washington Ave	Sullivant Ave & Whitethorne Ave
Bonham Ave & Cleveland Ave	E Broad St Between S 21st ST & S Ohio Ave	Sullivant Ave & Belvidere Ave
E 11th Ave & Cleveland Ave	E Main St & Carpenter St	Broad ST & Burgess Ave
Chittenden Ave & Cleveland Ave	E livingston Ave between S 22nd St & Sohio Ave	W Broad St & Stevens Ave
E 15 th Ave & Cleveland Ave	E livingston Ave & Miller Ave	W Broad St & Rodgers Ave
E 18 th Ave & Cleveland Ave	E Kossuth St & Lisle Alley	W Broad St & Cypress Ave
E Maynard Ave & Cleveland Ave	E Whittier St & Parsons Ave	Cleveland Ave & Belcher Dr
E Hudson St & Cleveland Ave	E Whittier St & Carpenter St	Cleveland Ave & North of Golden Gate Square
E Hudson St & Joyce Ave	E Whittier St Between S Ohio Ave & S Champion Ave	Malin St & Morse Rd Service Rd
E Hudson St & Parkwood Ave	Kent St & Seymour Ave	Groves Rd Between Courtright Rd & S Hamilton Rd
E Hudson St & Ontario St	E Livingston Ave Between Seymour Ave & Fairwood Ave	Courtright Rd & Petzinger Rd
E Hudson St & McGuffey Rd	E Main St Between S Ohio Ave & S Champion Ave	E Livingston Ave & Beachwood Rd
E 13th Ave & Cleveland Ave	S 22nd St between E Cherry St & E Rich St	E Livingston Ave & Courtright Rd
E 23rd Ave & Cleveland Ave	E Main St & S 22nd St	E Main St & S Wayant Ave
E Maynard Ave & Dresden St	E main St & Lilley Ave	E Main St & S Hampton Rd
Duxberry Ave & Dresden St	E Whittier ST & Wilson Ave	

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ATTACHEMENT #3 – Partial List of Wireless Equipment

ORIGIN Radio Name	DESTINATION Radio Name	LEGEND GROUP (Neighborhood)	ORIGIN IP ADDRESS	Origin Radio Latitude	Origin Radio Longitude	Origin Radio RxSignal(dBm) (if Avail)	Frequency (GHz)	Channel BW (MHZ)	Ratio	Est. Throughput (Mbps)	Rate (Mbps)
Sub	1-4	Weinland Park	10.21.3.160			-54	5.8	20	30/70	51.7	Adaptive
1-4	1-2	Weinland Park	10.21.3.164	39.99436442	-82.99932802	-51	5.835	20	30/70	51.7	Adaptive
1-3	1-3R	Weinland Park	10.21.3.177	39.99205166	-83.00310953	-50	5.78	20	50/50	10	26
1-3R	1-7	Weinland Park	10.21.3.172			-50	5.74	20	50/50	10	26
1-7	1-6R	Weinland Park	10.21.3.174	39.99421783	-83.00665142	-56	5.82	20	50/50	10	26
1-8	1-9	Weinland Park	10.21.3.184	39.99258869	-83.00629392	-57	5.84	20	19/81	9.3	13
1-6	1-6R	Weinland Park	10.21.3.189	39.98963928	-83.00191473	-57	5.8	20	20/80	28	39
1-7	1-9	Weinland Park	10.21.3.173	39.99421783	-83.00665142	-54	5.76	20	50/50	10	26
1-6	1-5	Weinland Park	10.21.3.192	39.98963928	-83.00191473	0	5.28	20	27/73	9.4	13
Sub	1-7	Weinland Park	10.21.3.168			0	18	20	N/A	0	0
1-1	1-6R	Weinland Park	10.21.3.197			0	0	20	0	0	0
2-1	2-1R	Linden	10.23.9.142	39.98612466	-82.98123624	-56	5.78	20	50/50	10	26
2-1R	2-SUB	Linden	10.23.9.144			0	0	20	50/50	10	26
2-SUB	2-2	Linden	10.23.9.146	39.99303843	-82.9823749	-59	5.28	20	10/90	2	26
2-SUB	2-3	Linden	10.23.9.147	39.99303843	-82.9823749	-56	5.82	20	10/90	2	26
2-SUB	2-4	Linden	10.23.9.148	39.99303843	-82.9823749	0	0	20	0	0	0

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2-4	2-5	Linden	10.23.9.158	39.99881543	-82.97634481	-60	5.29	20	50/50	10	26
2-4	2-7	Linden	10.23.9.159	39.99881543	-82.97634481	-57	5.74	20	50/50	50	Adaptive
2-6	2-7	Linden	10.23.9.165	40.00945103	-82.97002887	-58	5.82	20	8/92	9	13
2-7	2-8	Linden	10.23.9.170	40.01356763	-82.96744637	-55	5.8	20	50/50	21	52
2-7	2-10	Linden	10.23.9.171	40.01356763	-82.96744637	-68	5.76	20	50/50	26	19
2-8	2-9	Linden	10.23.9.175	40.013467	-82.96135308	-56	5.84	20	50/50	21	52
2-10	2-11	Linden	10.23.9.182	40.0140665	-82.97675484	-56	5.82	20	20/80	9	13
2-4	2-12	Linden	10.23.9.193	39.99881543	-82.97634481	0	0	20	0	0	0
2-4	2-13	Linden	10.23.9.194	39.99881543	-82.97634481	0	0	20	0	0	0
FS	2-15R	Linden	10.23.9.230			0	0	20	0	0	0
2-15R	2-15	Linden	10.23.9.232			0	0	20	0	0	0
2-15	2-14	Linden	10.23.9.235	40.00907513	-82.97241175	0	0	20	0	0	0
750 Long	3-2	Mt. Vernon	10.23.3.150			-50	5.735	20	8/92	9	13
3-2	750	Mt. Vernon	10.23.3.153	39.96766935	-82.97857787	-51	0	0	0	9	0
3-2	3-3	Mt. Vernon	10.23.3.156	39.96766935	-82.97857787	-53	5.82	20	50/50	10	26
3-2	3-4	Mt. Vernon	10.23.3.157	39.96766935	-82.97857787	-57	5.84	20	50/50	10	26
750 Long	3-1	Mt. Vernon	10.23.3.166			-56	5.84	20	8/92	9	13
COC	3-6	Mt. Vernon	10.23.5.135			-44	5.82	20	50/50	16	39
3-6	3-7R	Mt. Vernon	10.23.5.142	39.97239069	-82.97268108	-63	5.8	20	50/50	10	26
3-7R	3-7	Mt. Vernon	10.23.5.144			-45	5.76	20	50/50	9	13
4-SUB	Hospital	Livingston	10.23.8.130	39.95818069	-82.97410694	-29	18	0	0	0	0
Hospital	4-1	Livingston	10.23.8.134	39.95264046	-82.97950108	-57	5.8	20	20/80	8	52
Hospital	4-4	Livingston	10.23.8.135	39.95264046	-82.97950108	-52	5.82	20	19.5/80.5	8	52

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Hospital	4-3	Livingston	10.23.8.136	39.95264046	-82.97950108	-53	5.74	20	31.5/68/5	9	13
4-1	4-2	Livingston	10.23.8.140	39.94985834	-82.9720989	-51	5.76	20	20/80	9	13
4-4	4-5	Livingston	10.23.8.150	39.94427006	-82.98279222	-56	5.78	20	50/50	16	39
4-5	4-6	Livingston	10.23.8.154	39.94387083	-82.97538627	-48	5.76	20	50/50	16	39
4-7	Hospital	Livingston	10.23.8.160	39.9519689	-82.95508568	0	0	20	0	0	0
4-8	4-2	Livingston	10.23.8.164	39.94910036	-82.95401063	0	0	20	0	0	0
4-9	4-10R	Livingston	10.23.8.168	39.95795403	-82.97066372	0	0	20	0	0	0
4-10	4-10R	Livingston	10.23.8.172	39.95868177	-82.97201393	0	0	20	0	0	0
4-10R	4-SUB	Livingston	10.23.8.174	39.95783416	-82.97223601	0	0	20	0	0	0
4-12	4-15	Livingston	10.23.8.188			0	0	20	0	0	0
Childrens	4-14	Livingston	10.23.8.192			0	0	20	0	0	0
4-14	Hospital	Livingston	10.23.8.193			0	0	20	0	0	0
Childrens	4-16	Livingston	10.23.8.196			0	0	20	0	0	0
4-16	Hospital	Livingston	10.23.8.197			0	0	20	0	0	0
4-9	4-11	Livingston	10.23.8.200	39.95795403	-82.97066372	0	0	20	0	0	0
4-8	4-13	Livingston	10.23.8.204	39.94910036	-82.95401063	0	0	20	0	0	0
4-6	4-15	Livingston	10.23.8.208	39.94411581	-82.97046687	0	0	20	0	0	0
5-4 - 5-4 Relay		Hilltop	10.23.6.122	0	0	0	0	20	0	0	0
5-4 Relay - 5-4		Hilltop	10.23.6.123			0	0	20	0	0	0
5-4 Relay - 5-5		Hilltop	10.23.6.124			0	0	20	0	0	0
5-5 - 5-4 Relay		Hilltop	10.23.6.125			0	0	20	0	0	0
5-5 - 5-7		Hilltop	10.23.6.128			0	0	20	0	0	0

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5-6 - 5 Sub Relay		Hilltop	10.23.6.131			0	0	20	0	0	0
5-7 - 5-5		Hilltop	10.23.6.132			0	0	20	0	0	0
5-7 - 5 sub relay		Hilltop	10.23.6.135			0	0	20	0	0	0
5 Sub Relay - 5-6		Hilltop	10.23.6.136			0	0	20	0	0	0
5 Sub Relay - 5-7		Hilltop	10.23.6.137			0	0	20	0	0	0
5 Sub Relay - 5 Sub		Hilltop	10.23.6.140			0	0	20	0	0	0
5 Sub - 5 Sub Relay		Hilltop	10.23.6.141			0	0	20	0	0	0
N5 FS17 to N5R		Hilltop	10.22.17.172			0	0	20	0	0	0
N5R to N5 FS17		Hilltop	10.22.17.173			0	0	20	0	0	0
N5R to 5-1		Hilltop	10.22.17.174			0	0	20	0	0	0
5-1 to N5R		Hilltop	10.22.17.175			0	0	20	0	0	0
5-1 to 5-2		Hilltop	10.22.17.178			0	0	20	0	0	0
5-2 to 5-1		Hilltop	10.22.17.179			0	0	20	0	0	0
5-2 to 5-3		Hilltop	10.22.17.182			0	0	20	0	0	0
5-3 to 5-2		Hilltop	10.22.17.183			0	0	20	0	0	0
PDHQ	LSCG	Northbank Park	10.1.200.20	39.96502287	-83.00400035	0	0	20	0	0	0
PDHQ	Broad&Front	Northbank Park	10.1.200.21	39.96502287	-83.00400035	0	0	20	0	0	0
PDHQ	NBPP	Northbank Park	10.1.200.22	39.96502287	-83.00400035	0	0	20	0	0	0
Broad&Front	Broad&High	Northbank Park	10.1.200.25			0	0	20	0	0	0
NBPP	Multiple	Northbank Park	10.1.200.28			0	0	20	0	0	0
LongW	NBPP	Northbank Park	10.1.200.29			0	0	20	0	0	0

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Spring&Neil	NBPP	Northbank Park	10.1.200.30			0	0	20	0	0	0
SpringE	NBPP	Northbank Park	10.1.200.31			0	0	20	0	0	0
LSCGN	NBPP	Northbank Park	10.1.200.32			0	0	20	0	0	0
CityHall	Broad&Belle	Northbank Park	10.1.200.33			0	0	20	0	0	0
COSI	Multiple	Northbank Park	10.1.200.35			0	0	20	0	0	0
WashingtonN	COSI	Northbank Park	10.1.200.36			0	0	20	0	0	0
WashingtonN	Washington S	Northbank Park	10.1.200.37			0	0	20	0	0	0
Broad&Marconi	COSI	Northbank Park	10.1.200.38			0	0	20	0	0	0
WashingtonS	Washington N	Northbank Park	10.1.200.39			0	0	20	0	0	0
FS1	Nationwide&Front	Northbank Park	10.22.101.10			0	0	20	0	0	0
Muni Court	Multiple	Northbank Park	10.8.152.20			0	0	20	0	0	0
Mobile Tower 1	NBPP, COSI, Muni Court	Northbank Park	10.1.200.40			0	0	20	0	0	0
Mobile Tower 2	NBPP, COSI, Muni Court	Northbank Park	10.1.200.41			0	0	20	0	0	0
Fleet Facility		Groves Rd	10.30.250.23	39.92979965	-82.88564071	-40	5.735	20	0	0	0
Groves Rd Tower		Groves Rd	10.30.250.24			-40	5.735	20	0	0	0
Groves Rd Tower		Groves Rd	10.30.250.25			-64	5.84	20	50/50	0	0
Courtright & Petzinger		Groves Rd	10.30.250.26			-64	5.84	20	50/50	0	0
FS-21		FS-21	10.22.221.33			0	0	20	0	0	0
Main & Wyant		FS-21	10.22.221.34			0	0	20	0	0	0

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ATTACHEMENT #4 – Summary of NSC System Observations

The following summary provides a list of general observations documented by MCIS personnel during the Fall 2019 NSC maintenance phase with Simplex Grinnell/Johnson Controls. Following the summary are photos supporting the various observations and statements provided in this attachment.

I. General observations
   a. Antennas found mis-aligned.
   b. Cables needed re-secured to poles and/or mast arms.
   c. Radio firmware out of date.
   d. Radio configuration changes made by maintenance contractor were affecting system performance. MCIS re-configured radios and restored/improved system performance.
   e. Extensive tree growth observed along various RF paths.
   f. New residential/commercial buildings at North Bank Park (Spectrum analysis showed 5 GHz frequency highly saturated. Backhaul link receiving interference and dropping link.
   g. New building infrastructure along High St obstructing RF path.
   h. Multiport PoE devices for radios were utilized to power CCTV's.
   i. Some CCTV enclosures had abandoned/damaged equipment left inside. Devices and cabling in disarray and un-organized. Enclosure space completely full. Safety concern (potential to damage AC/DC power cords and cause shorts/injury).
   j. System is not being properly maintained to ensure performance and quality of service.
   k. Determined CCTV video across City network has high latency issues, resulting in poor video quality.

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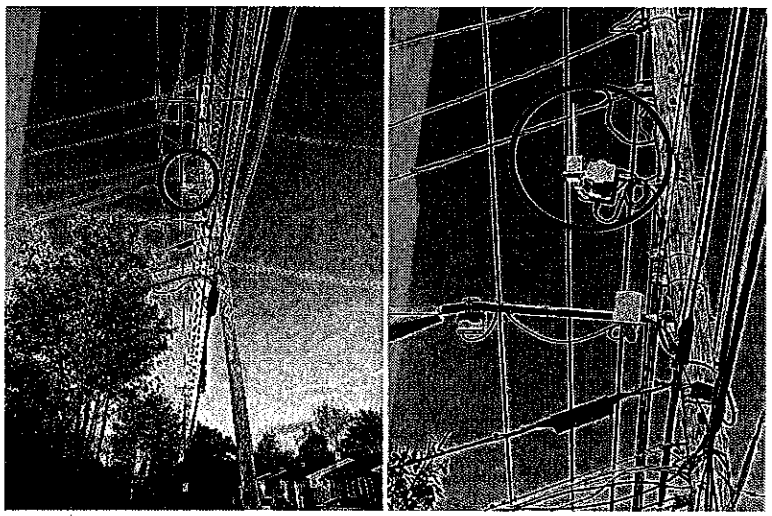
2019 Maintenance Photo Examples

Site 2-6

Site 2-6 Radio and RF path obstructed by tree growth.

Site 2-9



3rd Party radio with omni directional antenna installed directly above NSC radios

Site 2-10

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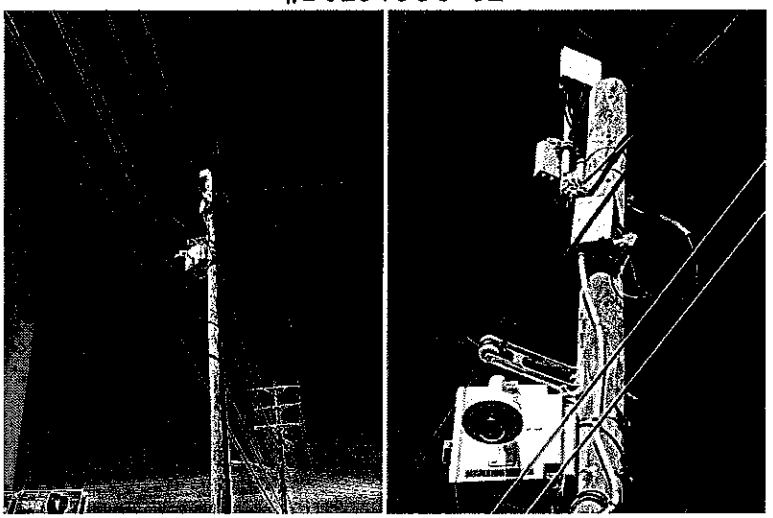

Site 2-10 has new high-power lines installed within close proximity to CCTV enclosure and radios. High potential for EMF interference – major safety concern. Site should be relocated

Site 2-15 Relay

Site 2-15 Relay path site 2-15 obstructed by tree growth.

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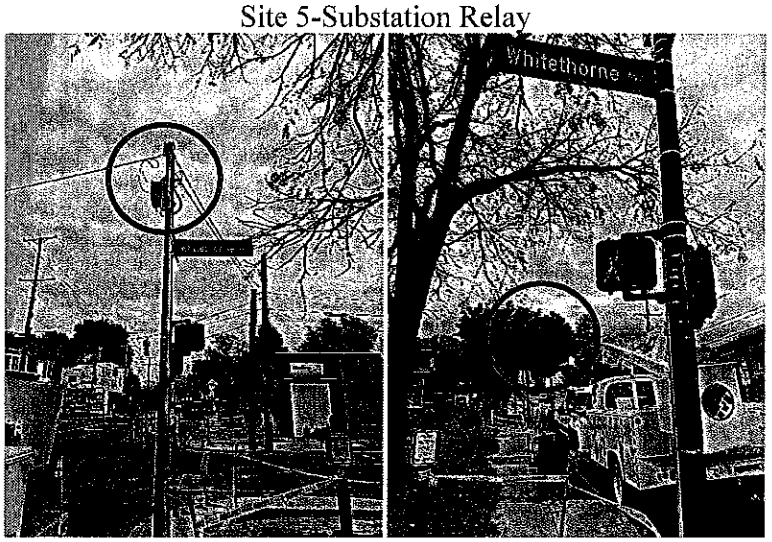
Site 2-Substation

Site 2-Sub – radios were mis-aligned to remote sites and cables were not secured. MCIS re-configured radios, aligned antennas and secured cables to mast.

Site 5-Substation Relay



Site 5 Sub Relay path to site 5-6 and 5-7 completely obstructed by tree growth.

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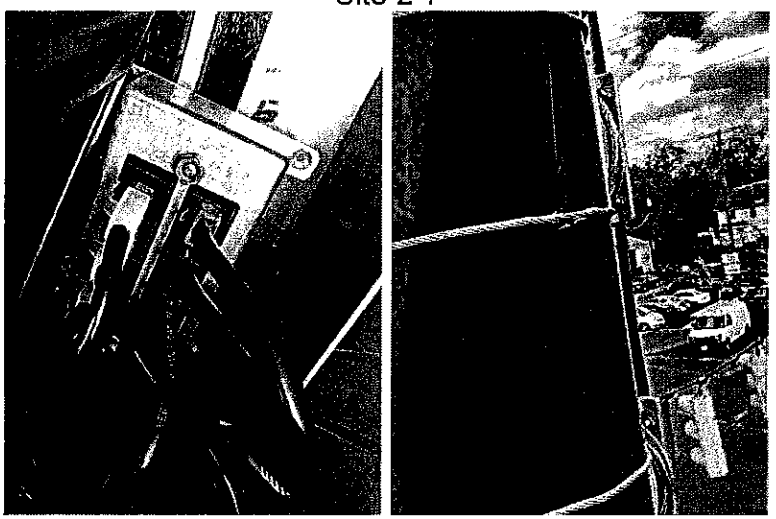
Site 2-7



Site 2-7 – (Left photo) four (4) port PoE supporting wireless radios utilized to power CCTV's (not part of system design). (Right photo) Arrow indicating damage to radio mount cable from lightning strike.

Site 2-7 CCTV Enclosure

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