



# Memorandum



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To: Honorable Mayor Carlos A. Gimenez  
Honorable Chairwoman Rebeca Sosa  
and Members, Board of County Commissioners

From: Patra Liu, Interim Inspector General

Date: December 2, 2013

Subject: Update on the OIG's Review of Security Devices to Prevent Copper Wire Theft

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In our memorandum dated May 30, 2013, the Office of the Inspector General (OIG) informed the Board of County Commissioners (BCC) and the Administration of some of our initiatives regarding security devices for copper wire theft. (Attachment A) We advised that concurrent with the Public Works and Waste Management Department's (PWWM) feasibility study and pilot implementation of anti-theft devices, the OIG was also independently assessing anti-theft strategies being implemented in other jurisdictions. This memorandum shares what we have learned. The first part of this memorandum describes our monitoring of PWWM's pilot program; the second half of this memorandum provides our survey results of devices used by other jurisdictions.

## **Part 1** **PWWM's Feasibility Study and Pilot Program** **Utilizing Devices Produced by Horsepower Electric, Inc.**

Prior to the implementation of the actual pilot program utilizing the anti-theft devices produced by Horsepower Electric, Inc. (Horsepower), PWWM had already begun utilizing other methods as a way to counteract the theft of copper wire in the County's roadway lighting system. Notably, in instances where vandalism had already occurred, PWWM restored the lighting system utilizing aluminum wiring in place of copper. As reported by PWWM in June 2013, the County has re-wired 545 spans with aluminum, and there have been no thefts to date. There was one act of vandalism or attempted theft that was aborted when the perpetrators realized that the wiring was aluminum and not copper. However, a little over a month later, in its report to the Board dated August 6, 2013 (Attachment B), PWWM reported:

[T]here has been an arrest of an individual found to have aluminum wire in his possession which matches that used in the County's street lighting systems. However, PWWM has not been able to identify where the wire

came from, nor been able to associate the wire to a specific streetlight outage.

While this is only one arrest, we believe that this is an area that the Scrap Metal and Copper Wire Theft Task Force should explore to determine if there is a new trend in the selling of aluminum and what prices scrap metal dealers are paying for aluminum. As noted by PWWM in its memorandum of June 4, 2013, aluminum wiring will only be an effective solution to prevent the theft of copper wire “so long as there is no increase in the value of aluminum in the resale market.”<sup>1</sup>

For the pilot project itself, PWWM initially identified three corridors where the Horsepower devices would be deployed. Due to logistical and poor field conditions on one of the corridors that made it an undesirable corridor for the study, it was removed from the pilot project. The two corridors employed in the study were:

1. NW 7<sup>th</sup> Avenue from NW 79<sup>th</sup> Street to 42<sup>nd</sup> Street (107 Street Lights)
2. NW 54<sup>th</sup> Street from Federal Highway to NW 6<sup>th</sup> Avenue (33 Street Lights)

PWWM's August 6, 2013 report provides specific details regarding the number of devices installed, including explanations as to why the number of devices required exceeded estimates, and total costs for the pilot project. Not including costs for replacing damaged wire spans and damaged pull boxes, the cost per device was \$225, which included installation by Horsepower. PWWM's pilot project officially ended on October 16, 2013. Essentially, there has not been any theft of copper wire in either of the two corridors, or against any of the County's roadway lighting assets, as evidenced by no light outages reported from either vandalism or theft since the pilot project was implemented. However, whether or not any attempts to steal copper wire were thwarted by the devices was a matter to be tested at the conclusion of the pilot project period.

OIG representatives were out in the field with PWWM personnel to inspect the installed anti-theft devices on October 29, 2013. The basic concept of the pilot project device is to establish a barrier to prevent the copper wire from being pulled out and stolen. Two of the devices are installed in each intermediate pull box, and two devices are installed in the pull box for each light pole. The devices make it difficult for a thief to pull the specific segment of copper wire that runs between the intermediate pull box and the light pole pull box. The areas inspected were:

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<sup>1</sup> Research conducted by the OIG suggests that there is more to the theft and resale of metal than just copper wire. Literature put out by other organizations indicates that theft of telecommunications cables may be on the rise. Other metal objects prone to theft include drain covers and even beer kegs, whose reported scrap value has gone from \$5 to \$40 per keg in the past few years.

- NW 7<sup>th</sup> Avenue from NW 54<sup>th</sup> Street to NW 59<sup>th</sup> Street;
- NW 7<sup>th</sup> Avenue from NW 77<sup>th</sup> Street to NW 73<sup>rd</sup> Street; and
- NW 54<sup>th</sup> Street from NW 1<sup>st</sup> Court to NE 2<sup>nd</sup> Avenue

Pull boxes on both sides of the street were inspected. Initially, in the first area inspected, if the pull box lid was still firmly bolted down, PWWM staff did not open the pull box; if the bolts were loose or missing, the pull box was opened and inspected. In the other two areas, PWWM staff turned on the street lights to determine how many lights, if any, were not working. Then the pull boxes were checked on those street lights that were not working and no vandalism or wire theft was found. A total of seventy-one (71) pull boxes were inspected or opened.

PWWM has advised the OIG that there have not been any additional acts of vandalism or theft since the pilot project was put in place.

## **Part 2**

### **Anti-Wire Theft Devices Utilized by Other Jurisdictions**

As part of this review, the OIG contacted several jurisdictions to survey what problems they may have experienced with metal wire theft and what deterrent or preventative measures they may have implemented. Below are the results of our survey.

#### **A. Florida Department of Transportation (FDOT)**

We contacted FDOT to find out if it had used (or was using) any anti-theft devices. We were advised that FDOT has used the device produced by Horsepower Electric, as well as the devices made by C.R.D. Protection Devices, LLC. Anti-theft devices have been deployed in FDOT District 4, and are in the process of being installed in FDOT District 6.

##### **1. FDOT District 4 – Comprising Broward, Indian River, Martin, Palm Beach, and St. Lucie Counties**

In 2011, FDOT District 4 issued a Fast Response Contract No. E4M65 to Horsepower Electric in the amount of \$119,000 for installing theft deterrent devices on the lighting system at various locations along SR-9 (I-95) due to wire theft in Palm Beach County. This contract involves repair and replacement of damaged wires and contains pay items for pull boxes, cable removal deterrent systems, and light poles. The contract calls for both equipment supply and installation. FDOT Contract No. E4M65 specifies that the cable removal deterrent system will be designed as a cable stopping device that is enclosed

within a PVC housing and functions as a deterrent device to prevent wire theft. Devices will be pre-approved by the FDOT Engineer prior to installation. The contract's pay item includes the furnishing and installation of the device. Horsepower Electric bid a price of \$160 for this pay item. The contract, whose total amount is \$119,000, was awarded to Horsepower Electric.

Horsepower Electric installed its own device, the Roadway Lighting Cable Security System, pursuant to this contract. FDOT advised the OIG that approximately 540 of these devices, at a price of \$160 each, were installed. The \$160 price is a lump sum price—there is no separate pricing for the equipment cost and the installation cost.

FDOT District 4 also advised that it has deployed over 470 Cable Removal Deterrent (CRD) devices manufactured by C.R.D. Protection Devices, LLC. FDOT provided the OIG with three other contracts that called for the supply and installation of CRD devices. For these three contracts, the prices for the CRD devices<sup>2</sup> and installation vary based on each contractor's FDOT contract, the model size required, and when the contract was procured. Prices ranged from \$63 to \$215, and are lump sum prices inclusive of both equipment supply and installation.

FDOT District 4 personnel advised that it was pleased with both Horsepower Electric's and CRD's devices.

## **2. FDOT District 6 – Comprising Miami-Dade and Monroe Counties**

FDOT District 6 issued Contract No. E-6H99 to Horsepower Electric on April 17, 2013 to provide labor, equipment and materials for maintenance and repair of the Roadway Lighting System. This contract specifically calls for the installation of CRD1 and CRD2 devices manufactured by C.R.D. Protection Devices, LLC. The contract unit price is \$225, which includes providing the CRD device, installing the device as per manufacturer's recommendations, excavating the conduit, placing a concrete pad around the pull box, and re-establishing the turf to a condition of the same or better as before the work was performed. In other words, Horsepower Electric's contract calls for it to install a product made by another company.

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<sup>2</sup> The CRD devices include the CRD1 and the CRD2. The difference in the models is the size of the unit.

### **3. Horsepower Electric's FDOT Contracts**

OIG representatives spoke with Mr. Michael Martinez, General Manager of Horsepower Electric, about their device and the pricing of it. We noted that FDOT District 4 received a price of \$160 per unit, including installation for Horsepower Electric to install its own device, whereas the work for District 6 (albeit utilizing the CRD devices) was \$225 per unit.<sup>3</sup> Mr. Martinez stated that the FDOT District 4 work entailed working on exit ramps, not in traffic, and did not require breaking concrete. Mr. Martinez explained that the District 6 work would be in traffic, on sidewalks, and generally involved higher installation costs.

Mr. Martinez also explained to the OIG that Horsepower Electric's device is also listed for use by the FDOT Turnpike District. We contacted the FDOT Turnpike District, who advised that it was the Orlando-Orange County Expressway Authority (OOCEA) [a co-partner] that was using the Horsepower Electric device. (The information that we received from OOCEA is stated below.)

### **4. Super Traffic Inc. Roadway Lighting Cable Security System**

FDOT provided the OIG with a brochure from a company called Super Traffic Inc. entitled "Method and Apparatus for Reducing Wire Theft from Street Light and Utility Poles." FDOT, however, due to recent personnel changes, was unable to provide us with definitive information about how seriously it was evaluating the device and whether it had started any bid process/negotiation to purchase the device.

Based on the brochure, the OIG tried contacting the company, but was not successful. The Florida Department of State, Division of Corporations, indicates the status of the company as "INACTIVE" and the last event is "ADMIN DISSOLUTION FOR ANNUAL REPORT" filed on 09/28/2012.

## **B. Miami-Dade Expressway Authority (MDX)**

MDX has purchased and installed over 2,400 of the CRD devices manufactured by C.R.D. Protection Devices Services, LLC. The CRD devices were purchased directly from the manufacturer but were installed by MDX's lighting contractor, Transfield Services or its subcontractor(s). The purchase cost ranged from \$81.72

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<sup>3</sup> Similarly, the cost for the supply and installation of Horsepower Electric's device for the PWWM pilot project was \$225 per unit.

to \$105.61 per unit, and the installation cost ranged from \$124.20 to \$178.89 depending on location, accessibility and other factors.

MDX personnel advised us that they were very happy with the CRD devices and, in fact, have revised their technical specifications for lighting to require that the CRD anti-theft devices be installed in all new construction of MDX roadway lighting.

OIG representatives spoke to CRD about its device. According to CRD, to install the device an adapter is glued to the wire conduit and reducing bushings are placed over the wires. Each wire is then individually wrapped with rubber tape, and a wrapped rubber expander is placed in the center of the wires, which are then completely wrapped with more rubber tape. Then a housing is placed over the wrapped wires and threaded onto the adapter and secured. CRD stated that thieves would need to spend too much time attempting to remove wires, increasing their chances of being apprehended by law enforcement, which thus acts as a deterrent against stealing the copper wire.

### **C. Orlando-Orange County Expressway Authority (OOCEA)**

OOCEA was in the process of considering the installation of both the Horsepower device and the CRD device in its construction of State Road 429 in Apopka, as well as in State Road 417 – the turnpike interchange. This was based on information OOCEA received from FDOT District 4, who has used both of these devices in Palm Beach County. However, during the process of specifying the two anti-theft devices, OOCEA learned of a third device, the Copper Keeper, which was apparently cheaper and easier to install.

Just recently, we learned that OOCEA has specified in its State Road 429 Apopka construction project contract the installation of the Copper Keeper anti-theft devices. OOCEA requested from its contractor a Proposal for Copper Keeper installation. The estimated needed quantities for furnishing and installing the Copper Keeper devices are 162 units for new conduit and 109 units for existing conduits, i.e., retrofits. The contracted prices for these two pay items are \$104 for new conduit and \$178.50 for existing conduit. Again, these are lump sum prices inclusive of both equipment supply and installation. This scope of work has been approved by OOCEA and is progressing.

OOCEA advised that it chose the Copper Keeper anti-theft device because it is easier and cheaper to install than the other two devices. In addition, the Copper Keeper comes with a special security-keyed socket tool that allows only authorized personnel to be able to remove the device. OOCEA worked out a deal with CWTD

Distributors (the manufacturer of the Copper Keeper) to customize the special security-keyed socket tool for OOCEA so that it would be unique for OOCEA within the State of Florida.

#### **D. Jurisdictions using CWTD's Copper Keeper Device**

The OIG contacted CWTD Distributors, LLC, makers of the Copper Keeper, about its device. We asked CWTD what jurisdictions have purchased the Copper Keeper; CWTD provided us with the names and contact information for three municipalities, as described below.

- City of Sunnyvale, California – They have used around one hundred of the devices in the Sunnyvale Park Pathway Lighting System over the past several years and they have been found to be very effective. They advised that they have not lost any wiring where the device has been used.
- City of Ontario, California – They have used over one thousand of the devices whenever they have had to replace stolen wire. They have not had to go back to replace wire wherever the devices had been installed.
- City of Henderson, Nevada – They have used around one hundred of the devices in their parks. They advised that the device is not a long term fix, but it is a quick deterrent. They have used other methods, such as putting a sheet of plastic over the electrical valve in the electrical valve box and filling it with grout or concrete, which then deters the copper wire thieves. They also tack weld all the electrical panels on their light poles, which seems to work well.

#### **E. The Florida Power & Light Company (FPL)**

FPL has one of its employees as a member on the Miami-Dade County Scrap Metal and Copper Wire Theft Task Force (which the OIG is a member of as well). The OIG asked that person about FPL's anti-wire theft deterrence policies. The FPL representative responded that foremost, FPL does not use copper conductors on its underground street installations. It also does not use any special theft prevention devices on its installations, other than making sure that its conductors are not directly accessible. Also, it was explained that underground conductor terminations are kept behind bolted down lids (e.g., hand holes) or behind a bolted and/or locked door—typically locked using a padlock (e.g., pad mounted transformers, cabinet enclosures, or vault rooms).

## **F. Other Jurisdictions Surveyed By the OIG Not Utilizing Anti-Theft Devices**

The OIG contacted other jurisdictions, both in the State of Florida and outside the State, to find out if they were having copper wire theft issues, and how they might be resolving or minimizing those issues. The jurisdictions and a summary of their responses follow:

### ***Broward County, Street Light Section***

- Not much of a problem anymore; using aluminum wire instead
- Resale cost of aluminum is much less; not worth stealing
- Burning off insulation to remove identifying information off of aluminum wire melts the aluminum wire
- Tried special locks and lids on pull boxes, but that made it harder for maintenance personnel to access
- They did not know about Horsepower Electric or CRD1 devices

### **City of Jacksonville/Jacksonville Electric Authority (JEA):**

- Not a big problem for JEA
- Most thefts of wire are from the pull box to a commercial building; that wire is owned by the property owner, not JEA
- City has strict laws on resale of metals to scrap metal facilities
- Legislation for metal theft prevention is currently being prepared for submittal by JEA; they will provide documentation to the OIG

### **City of Orlando:**

- Advised that they use aluminum instead of copper and, therefore, do not have metal theft problems

### **City of Fort Lauderdale:**

- Advised that copper wire theft from street lights is not a significant problem and they do not use any sort of anti-theft devices

### **City of Atlanta, Georgia:**

- They are having problems with copper wire theft
- They have considered changes such as welding hand hole covers, putting padlocks on boxes, and putting Band-its around T-Bases
- Thefts are occurring at traffic signals, as well as street lights
- They did not know of any anti-theft devices

## **G. Alternatives Other Than Anti-Theft Devices**

The foremost alternative consideration would be the transition to aluminum wiring. As mentioned earlier, the use of aluminum wiring has worked well because the resale price of aluminum is much less than that of copper wire, therefore the thieves won't bother to try to steal it. In addition, when the thieves try to melt off the insulation on the aluminum wire, it will melt the aluminum wire since the melting point of aluminum is much lower than that of copper.

Other measures that should be considered—either on their own or in conjunction with the utilization of anti-theft devices—include directly burying the cables (that is, not within a conduit) and/or burying the pull boxes. Solar-powered lighting should also be explored. We also learned of “smart” street lighting systems that are being utilized in places such as San Jose, California, and some cities in Australia. Smart lighting systems can include LED (light-emitting diode) lighting that is more energy efficient; lighting that dims until motion is detected nearby (such as vehicle traffic or people walking); and video cameras that help prevent crime and theft, and other features. While smart lighting systems can be considerably more expensive than standard or “normal” systems, they might be considered for pedestrian friendly, higher traffic areas. Clearly, any evaluation of these new technologies must include an assessment of how they will work in the long run and whether they are cost efficient.

## **CONCLUSION**

This review was intended to provide information about the types of anti-theft devices being utilized by other jurisdictions. While this report contains some product and installation prices from other jurisdictions, these prices are being stated herein for informational purposes only. Clearly, the County's roadway lighting assets are different, especially in their locations, from the lighting assets of FDOT, MDX and other expressway authorities. Pricing is likely to be contingent on quantities ordered, overall scope of work (i.e., new construction versus repair), location of work, and competition.

Any decision to purchase and install anti-theft devices should also be made strategically as the ability to install these devices county-wide may be cost prohibitive. Weighing the benefits of aluminum wiring should also be considered. While there was one arrest of an individual with aluminum wiring in his possession, as reported earlier, the wiring could not be linked to a streetlight outage. Through inquiries made during our assessment, the OIG was not made aware of any recent thefts of aluminum wiring from the County's roadway lighting assets.

Lastly, consideration should be made to new contract terms that were added to the County's Street Lighting Maintenance Contracts that minimize the cost to the County for repairing or replacing copper wire damaged from either theft or vandalism. For example, RPQ No. 20130019-R, Section 715ME Roadway Lighting Maintenance, Subsection G. *Diagnostics, Maintenance, and Repair*, Item 10 states in part:

Replace complete span, pole to pole, of wire conductor damaged from either theft or vandalism. Perform all repairs and replace damaged or malfunctioning components when necessary. Contractor may be directed at no additional cost to the County to use #3 RHH-RHW/XLP-USE aluminum conductors instead of copper or install an anti-theft device to prevent subsequent theft of the copper conductor after its replacement. Anti-theft devices must be approved by the Department prior to use and must meet all applicable standards and codes. (Emphasis added.)

Now that the pilot project is over, we would expect that PWWM provide its own professional assessment of its demonstration project. Should it be the County's determination that it is beneficial to install additional anti-theft devices on lights not already wired with aluminum, then we strongly urge PWWM personnel to travel to the jurisdictions utilizing the CRD and Copper Keeper devices to see, first hand, how the devices are installed and hidden from view. Any decision to purchase and install anti-theft devices should be subject to competitive pricing and/or a bid process.

The OIG will continue to work closely with PWWM and the Scrap Metal and Copper Wire Theft Task Force on these matters of mutual concern. Please contact Supervisory Special Agent Cedric Johnson at 305-375-1946 for any questions regarding our review.

#### Attachments

cc: Alina Hudak, Deputy Mayor/Interim PWWM Director  
J.D. Patterson, Jr., Director, Miami-Dade Police Department (MDPD)  
Antonio Cotarelo, Assistant Director of Construction, PWWM  
Frank Aira, Acting Chief, Traffic Signal and Signs Division, PWWM  
Lt. Denise Bernhard, Chair of the Scrap Metal and Copper Wire Theft Task Force, MDPD  
Charles Anderson, Commission Auditor



# Memorandum



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To: Hon. Carlos A. Gimenez, Mayor, Miami-Dade County  
Hon. Chairwoman Rebeca Sosa  
and Members, Board of County Commissioners

From: Patra Liu, Interim Inspector General

Date: May 30, 2013

Subject: Security Devices to Prevent Copper Wire Theft; Ref. IG10-53

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The Board of County Commissioners is scheduled to hear Agenda Item 2B1 *Report on the Feasibility of Implementing Security Devices for Copper Wire and Scrap Metal Theft Prevention* during its meeting of June 4, 2013 (Attachment 1). By way of this memorandum, the Office of the Inspector General (OIG) wishes to inform you of some of our initiatives in this area. As you may be aware, the OIG is a member of the Scrap Metal and Copper Wire Theft Task Force; but even prior to the official formation of the task force, we worked closely with public officials, personnel from both the City of Miami Police Department and the Miami-Dade Police Department (MDPD), and Public Works and Waste Management Department (PWWM) staff to assess the targeted areas and identify trends in the theft of scrap metal and copper wire.

Concurrently with PWWM's feasibility study of anti-theft devices, the OIG is also independently assessing anti-theft strategies being implemented in other jurisdictions and their similarity of field conditions to Miami-Dade County's. Just recently, the OIG has made several documentation requests relative to this inquiry. The OIG would like the time to review these documents and, as necessary, follow-up with the information sources. We recognize that the theft of copper wire from our roadway lights is a public safety issue, and it must be addressed expeditiously. But if addressed without adequate time for review, the costs to fix the problem may be wasted on solutions unproven to our field conditions. Thus, we concur with the Administration's recommendation to proceed with the ongoing pilot study and procurement of the successor contracts, as previously planned. In the meantime, the OIG will independently monitor the pilot study, as well as conduct our own research into this matter. The results of our review will be shared with PWWM, the Task Force, and this Board.

#### Attachment

cc: Alina Hudak, Deputy Mayor  
Kathleen Woods-Richardson, Director, Public Works and Waste Management  
Lt. Denise Bernhard, MDPD, Chair, Scrap Metal and Copper Wire Theft Task Force  
Charles Anderson, Commission Auditor, Miami-Dade County

**ATTACHMENT A**

# Memorandum



**Date:** June 4, 2013

**To:** Honorable Chairwoman Rebeca Sosa  
and Members, Board of County Commissioners

**From:** Carlos A. Gimenez  
Mayor 

**Subject:** Report on the Feasibility of Implementing Security Devices for Copper Wire and Scrap Metal Theft Prevention

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## Background

The theft of copper wiring continues to be a problem for many agencies throughout the State of Florida and the country, as copper wiring is stolen from electrical systems and resold to scrap metal facilities. Over the past several years the Public Works and Waste Management Department (PWWM) has been affected by the theft of copper wiring from the County's roadway lighting systems.

## Street Light Maintenance Contracts

Currently, the County has two (2) active Street Lighting Maintenance Contracts, and is in the process of procuring four (4) replacement contracts as follows:

- Project #20100407 with Prime Electrical Contractors, Inc. – This is a MCC7040 CSBE Set-Aside Contract for the maintenance of 2,931 street lights in the Northeast portion of the County. This Contract was awarded for a three (3) year term, for a total amount of \$668,359.38, and runs through July 31, 2013.
- Project #20100408 with Horsepower Electric, Inc. (HPE) - This is a Capital Contract for the maintenance for 22,135 street lights throughout the County. This contract was originally bid for 20,050 Street lights, but as a result of new projects an additional 2,085 street lights were added to the County's streetlight network, and subsequently to this Contract. The scope of work for this Contract includes a provision requiring that the contractor repair any damage associated with acts of vandalism, at no cost to the County, including re-wiring if using copper wiring. This Contract was awarded for a three (3) year term, for a total amount of \$4,924,202.36 (including \$827,290.68 through Change Order), and runs through August 31, 2013. The Change Order approved under Resolution No R-1023-12 added monies to cover the maintenance of the additional lights, the costs of retrofitting with alternate anti-theft devices at the direction of the County, and to address pre-existing vandalism and damage to the streetlight system that occurred during the six (6) month period between the effective dates of the maintenance contracts.

Currently two (2) contracts have been advertised, with bids scheduled to be received by the end of this month. These contracts are set-aside for Community Small Business Enterprise firms through the MCC 7040 Program, and represent approximately 25% of the total street lights under the County's maintenance purview. The balance of street lights are to be included in two (2) additional maintenance contracts which will be competitively bid through the MCC 7360 Program. All four (4) new contracts are scheduled to be in effect to coincide with the expiration of the current contracts. The new contracts keep the responsibility to address acts of vandalism on the awarded contractor, and will include provisions to require the replacement of copper wiring with aluminum wiring upon the instance of vandalism, at no additional cost to the County.

**Vandalism of Roadway Lighting System**

In an effort to address the continued vandalism of the County's roadway lighting system, PWWM implemented a number of anti-theft solutions through the services of the existing maintenance contracts. In 2009, the County began retrofitting the lighting system's pull boxes with lids which used military grade locks to secure them in place. These worked for a period, until thieves discovered they could bypass the locks by breaking through the lids. In response, the County employed high strength polymer lids with the locks. However, this solution ultimately proved ineffective once perpetrators began breaking not only the pull boxes themselves but the concrete sidewalks surrounding them.

In late 2010, the County took the initiative of replacing stolen copper wires with aluminum wiring in order to mitigate the repetitive loss of copper wiring. To date, the County has rewired approximately 545 spans (wiring connections between poles) with no recorded thefts of the wiring, and only one (1) instance of vandalism. This one (1) instance was quickly repaired since the attempt to steal the wires was abandoned when the thieves realized the wires were not copper, as the lack of a resale market for aluminum makes it much less profitable. Furthermore, since there is a small difference in the price of new aluminum wire versus new copper wires, PWWM has adopted the use of aluminum wires as an accepted alternative to copper wiring within roadway lighting standards. The corridors listed below have been retrofitted with aluminum wiring as a result of their being repeatedly vandalized to remove the copper wiring:

- NW 7 Avenue, from NW 79 Street to NW 17 Street, Commission District 3
- NW 62 Street, from US-1 to the Rail Road Tracks, Commission District 2
- NW 32 Avenue, from NW 79 Street to the River, Commission District 2
- NE/NW 54 Street, from Federal Hwy to Douglas Road, Commission District 3
- NW 22 Avenue, from NW 79 Street to NW 62 Street, Commission District 2
- NW 36 Street, from NW 17 Avenue to NW 24 Avenue (partially), Commission District 3
- NW 71 Street, from I-95 to NW 19 Avenue (partially), Commission District 2
- NW 79 Street, from I-95 to NW 22 Avenue (partially), Commission District 2
- NW 17 Avenue, from NW 79 Street to NW 95 Street (partially), Commission District 2

While aluminum wire has proven to be effective, it should be noted that this is a solution to prevent repeated vandalism, and that it remains effective so long as there is no increase in the value of aluminum in the resale market. The implementation of the aluminum wiring solution has cost the County approximately \$498,675.00, and was completed through a Change Order to a current contract, approved by the Board of County Commissioners (BCC) on December 4, 2012 under Resolution R-1023-12. It is important to note that the NW 71 Street corridor, which was the most impacted by wire theft, has not been vandalized since the system was retrofitted with aluminum wire, a span of approximately 18 months.

More recently, HPE has introduced a product they claim prevents the theft of copper wiring from the street lighting systems. The specific device was developed and patented by HPE, and is therefore not available from other sources. The Florida Department of Transportation (FDOT) has implemented the use of this device on segments of I-95 and it has proven to be successful, with only one (1) reported incident of an attempt to steal the copper wiring. PWWM has reviewed the effectiveness of the device at FDOT installations and noted that the lighting installations along I-95 are considerably different than the installations along the County's arterial roadways. The lighting installations along I-95 are mounted on the center median wall, rendering attempts at stealing the wire more obvious, and as such, more difficult. Furthermore, FDOT monitors I-95 from the SunGuide Transportation Center through the use of

surveillance cameras. In contrast, the County's lighting system is more vulnerable as vehicles can easily park near any of the pull boxes, making surveillance more difficult.

In January of this year, HPE demonstrated the anti-theft device to PWWM and installed it at four (4) light poles along NW 7 Avenue at no cost to the County. However, in an effort to determine a more accurate depiction of the devices long term efficacy, PWWM requested an expanded installation. In February 2013 PWWM and HPE negotiated a pay item to conduct a pilot test of the device on 208 street lights, to be paid from the current maintenance contract's contingency funds at an estimated cost of \$140,000.00 (\$225.00 per device with two (2) devices per pole, and an estimated 100 intermediate pull boxes). The corridors selected for the pilot study are:

- NW 7 Avenue from NW 79 Street to 42 Street (107 Street lights)
- NW 46 Street from NW 6 Court to NW 38 Avenue (68 Street lights)
- NW 54 Street from Federal Highway to NW 6 Avenue (33 Street lights)

Currently, HPE has provided that they have completed the installation of 336 devices (107 Street lights and 61 intermediate pull boxes) along the NW 7 Avenue corridor. However, as of today, they have only called for inspection of the devices installed along the east side of this corridor. PWWM had anticipated being able to evaluate the effectiveness of the device over a three (3) to six (6) month period. Given that the devices were only installed on one (1) segment of the roadway, and only a month has elapsed, no conclusive determination as to the long term effectiveness of the devices can be made at this point. However, there has not been a report of wire theft along this corridor since the partial installation of the pilot study.

The following table depicts the 72 instances where corridors have been vandalized within the past three (3) years. Instances of vandalism have increased approximately 300% from previous years (2006-2009) in which there were 23 instances of vandalism. Additionally, PWWM has been working with the City of Miami to address recent vandalism to the streetlights along NE 2 Avenue, from NE 50 Street to NE 71 Street. The County is currently working with the City of Miami and HPE to have the approximately 95 spans of wires restored.

Corridors	Impacted street lights	Total street lights within this corridor	# of Times vandalized
NW 71 ST, I-95 to NW 19 AV	35	35	11
NW 7 AV, 42 ST to NW 79 ST	107	107	6
NW 46 ST, 6 Ct to NW 22 AV	34	34	6
NW 46 ST, 22 AV to NW 38 AV	34	34	5
NW 54 ST, 6 CT to Federal HWY	33	33	5
NW 7 AV, 19 ST to NW 36 ST	41	41	4
NW 12 AV, 16 ST to NW 54 ST	82	82	4
NW 17 AV, 79 ST to NW 95 ST	36	36	4
NW 32 AV, 36 ST to NW 79 ST	54	54	4
NW 95 ST, 17 AV to NW 27 AV	26	26	3
NW 22 AV, 62 ST to NW 79 ST	59	59	3
NE 61 ST, Biscayne Blvd to NE 4 AV	5	5	3

NE/NW 62 ST, Biscayne Blvd. to NW 27 AV	121	121	2
NW 36 ST, 17 AV to NW 24 AV	31	31	2
NW 20 ST, 12 AV to NW 17 AV	18	18	2
Douglas Rd, 62 ST to NW 79 ST	27	27	2
Biscayne Blvd, 38 ST to NE 62 ST	105	108	1
NW 62 ST, NW 17 to NE 4 AV – R/R	79	79	1
NW 103 ST, 17 AV to NW 19 AV	8	33	1
Miami Gardens Drive, 36 AV to NW 43 CT	21	35	1
SW 112 AV, Coral Way to Bird Road	22	22	1
SW 117 AV, 152 ST to SW 184 ST	65	65	1
<b>Totals</b>	<b>1,043</b>	<b>1,085</b>	<b>72</b>

Over the last three (3) years a total of 1,043 street lights have been impacted by wire theft, which is an average of 29 lights per month. There are approximately 877 street lights within the impacted areas which would not have a security device installed assuming the pilot study referenced earlier is completed. At the current rate negotiated with HPE, the installation of security devices for the corridors listed before would cost the County an estimated \$484,650.00, and take approximately four (4) to six (6) months to implement.

**Alternatives for Implementing Security Devices**

During the May 7, 2013 BCC meeting, Resolution R-367-13 was adopted and directives were given requiring a report analyzing the feasibility of implementing security devices for copper wire and scrap metal theft prevention be provided at the next BCC meeting. During the meeting the following was discussed:

- 1) Limit the installation of security devices to those areas experiencing repetitive instances of theft.
- 2) Explore the possibility of extending HPE's Proactive Street Lighting Repair and Maintenance Contract through a Change Order to include the installation of HPE's device along those areas experiencing repetitive theft.
- 3) Include the use of a security device in the new maintenance contracts currently being procured.
- 4) Availability of funding for the installation of the security devices.

Following are two (2) alternatives for installing security devices along the County's street light network:

- 1) Complete the pilot study currently under way and continue with the procurement of the four (4) new maintenance contracts as specified in the Street Light Maintenance Contracts section.
- 2) Effectuate a change order to the existing HPE Streetlight Maintenance Contract (PWWM Project No. 20100408 as follows:
  - a. Extend the contract duration by a certain time period. This would require an associated increase in funding for the maintenance of the street lighting system during the extended period. Based on the current number of lights under HPE's maintenance purview, the estimated monthly rate for maintenance is \$110,000 (approximately 22,135 street lights at the contract's \$4.98 per light / per month rate).
  - b. Add a pay item for the installation of the anti-theft devices and an estimated \$484,650.00 in contract capacity (two devices at \$225.00 per device at approximately 877 street lights and an estimated 200 intermediate pull boxes) for the vandalized corridors referenced above. Contract amount could be further increased to allow for the installation of

- security devices at additional locations determined by the County to be impacted by vandalism.
- c. Adopt the necessary technical specifications which are to be included in the new maintenance contracts solicitations.
  - d. Include a 10% contingency and other allowances (e.g., maintenance of traffic, off-duty law enforcement officer, permits) for the extended period.

**Fiscal Impact**

There is no additional fiscal impact associated with Alternative No. 1 as the one-time expenditure of \$140,000.00 is being funded through the existing contract's contingency funds. The fiscal impact associated with Alternative No. 2 is approximately \$484,650.00. If approved, this one-time expenditure for the installation of the security devices can be absorbed in the budget for the maintenance of street lights. The current contracts are funded with Secondary Gas Tax revenues.

PWWM currently maintains and operates approximately 25,000 streetlights throughout the County. Installing the security devices Countywide would have an estimated fiscal impact of \$12,375,000.00 (two (2) devices for each of the 25,000 streetlights at \$225.00 per device and a 10% contingency for intermediate pull boxes). Of the 25,000 streetlights, approximately half belong to FDOT and are maintained by the County through an existing maintenance and operation agreement. In 2012, FDOT reimbursed the County \$2,218,609.00 for the maintenance and operation of 12,229 streetlights. PWWM staff will contact the FDOT District VI office in an effort to identify any available funding to partner in this effort. Finally, the installation of this anti-theft device on County maintained streetlights would not serve as a benefit to any other agency or utility companies.

**Recommendation**

It is PWWM staff's professional recommendation that the County proceed with the ongoing pilot study and procurement of the four (4) new Street Light Maintenance contracts.

- c: Honorable Harvey Ruvin, Clerk of the Board  
Robert A. Cuevas, Jr., County Attorney  
Alina T. Hudak, Deputy Mayor  
Kathleen Woods-Richardson, Director, Department of Public Works and Waste Management  
Christopher Agrippa, Division Chief, Clerk of the Board

# MEMORANDUM

Agenda Item No. 1.1(A)(6)

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**TO:** Honorable Chairwoman Rebeca Sosa  
and Members, Board of County Commissioners

**DATE:** May 7, 2013

**FROM:** R. A. Cuevas, Jr.  
County Attorney

**SUBJECT:** Resolution directing County  
Mayor to perform a feasibility  
analysis concerning the use of  
security devices and other  
preventative measures to reduce  
the incidences of copper wire and  
scrap metal theft

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The accompanying resolution was prepared and placed on the agenda at the request of Prime Sponsor Commissioner Audrey M. Edmonson.

  
\_\_\_\_\_  
R. A. Cuevas, Jr.  
County Attorney

RAC/smm



MEMORANDUM

(Revised)

TO: Honorable Chairwoman Rebeca Sosa and Members, Board of County Commissioners

DATE: May 7, 2013

*RAC*

FROM: R. A. Cuevas, Jr.  
County Attorney

SUBJECT: Agenda Item No. 11(A)(6)

Please note any items checked.

- \_\_\_\_\_ "3-Day Rule" for committees applicable if raised
- \_\_\_\_\_ 6 weeks required between first reading and public hearing
- \_\_\_\_\_ 4 weeks notification to municipal officials required prior to public hearing
- \_\_\_\_\_ Decreases revenues or increases expenditures without balancing budget
- \_\_\_\_\_ Budget required
- \_\_\_\_\_ Statement of fiscal impact required
- \_\_\_\_\_ Ordinance creating a new board requires detailed County Mayor's report for public hearing
- \_\_\_\_\_ No committee review
- \_\_\_\_\_ Applicable legislation requires more than a majority vote (i.e., 2/3's \_\_\_\_\_, 3/5's \_\_\_\_\_, unanimous \_\_\_\_\_) to approve
- \_\_\_\_\_ Current information regarding funding source, index code and available balance, and available capacity (if debt is contemplated) required

Approved \_\_\_\_\_ Mayor  
Veto \_\_\_\_\_  
Override \_\_\_\_\_

Agenda Item No. 11(A)(6)  
5-7-13

RESOLUTION NO. \_\_\_\_\_

RESOLUTION DIRECTING COUNTY MAYOR OR COUNTY MAYOR'S DESIGNEE TO PERFORM A FEASIBILITY ANALYSIS CONCERNING THE USE OF SECURITY DEVICES AND OTHER PREVENTATIVE MEASURES TO REDUCE THE INCIDENCES OF COPPER WIRE AND SCRAP METAL THEFT AND PROVIDE A REPORT WITHIN 60 DAYS WHICH INCLUDES A CALCULATION OF COUNTY EXPENDITURES TO DATE RELATED TO COPPER WIRE AND SCRAP METAL THEFT AND RECOMMENDATIONS FOR IMPLEMENTING SECURITY DEVICES FOR COPPER WIRE AND SCRAP METAL THEFT PREVENTION

WHEREAS, skyrocketing prices for metals, especially copper, has resulted in a significant increase in the theft of copper, aluminum and other ferrous and nonferrous metals material in Miami-Dade County; and

WHEREAS, such thefts include metals material from light poles, which create power outages and endanger the health, safety and welfare of the public, particularly the elderly and children; and

WHEREAS, such thefts are economically burdensome on the County since the County is required to expend funds to replace or repair stolen or vandalized street signs and street lights owned by the County; and

WHEREAS, this Board has taken steps to prevent copper wire and scrap metal theft by enacting Ordinance No. 11-17 which created Sections 8A-9 through 8A-9.6 of the Code of Miami-Dade County. This legislation makes it more difficult for thieves to sell stolen items by

prohibiting scrap metal dealers from purchasing items commonly obtained through theft, prohibiting scrap metal dealers from engaging in cash transactions for certain items, and requiring scrap metal dealers to keep sale records, including a copy of the seller's identification; and

WHEREAS, this Board has encouraged an ongoing dialogue on the issue of preventing scrap metal and copper wire theft by creating the Scrap Metal and Copper Wire Theft Task Force, which issues recommendations to the Board on the enforcement of existing laws preventing scrap metal and copper wire theft, ways to educate businesses and the community on complying with the law, and other means of preventing the illegal sale of scrap metal and copper wire; and

WHEREAS, scrap metal and copper wire theft remains a serious issue and more can be done to keep our community safe; and

WHEREAS, the use of security devices and other preventative measures may reduce the incidences of scrap metal and copper wire theft; and

WHEREAS, Miami-Dade County presently has contracts with Horsepower Electric, Inc. and Prime Electrical Contractors, Inc. for the proactive maintenance and repair of the roadway lighting under the County's jurisdiction; and

WHEREAS, the installation of security devices on light poles or other preventative measures may be incorporated into the scope of work for Miami-Dade County's Proactive Street Light Maintenance contracts, or into the scope of work for another existing Miami-Dade County contract; and

WHEREAS, a feasibility study on the use of security devices and other preventative measures is necessary to determine the best course of action to prevent future scrap metal and copper wire theft; and

WHEREAS, it is essential for Miami-Dade County to have a full understanding of the amount of funds expended on the prevention of scrap metal and copper wire theft in order to offer its citizens the most protection with the least economic impact,

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA, that this Board:

Section 1. Directs the County Mayor or the County Mayor's designee to perform a feasibility analysis on the use of security devices and other preventative measures to reduce the incidents of scrap metal and copper wire theft.

Section 2. Directs the County Mayor or the County Mayor's designee to submit a report to this Board with the results of the analysis within 60 days of the effective date of this Resolution. Such report shall include: 1) a calculation of County expenditures to date related to scrap metal and copper wire theft; 2) recommendations for implementing security devices and/or other preventative measures countywide; 3) the expected cost for the recommended course of action; and 4) an explanation of whether the installation of security devices on light poles or other preventative measures may be incorporated into the scope of work for Miami-Dade County's contracts with Horsepower Electric, Inc. and Prime Electrical Contractors, Inc., or into the scope of work for another existing Miami-Dade County contract.

The Prime Sponsor of the foregoing resolution is Commissioner Audrey M. Edmonson. It was offered by Commissioner \_\_\_\_\_, who moved its adoption. The motion was seconded by Commissioner \_\_\_\_\_ and upon being put to a vote, the vote was as follows:

	Rebeca Sosa, Chairwoman	
	Lynda Bell, Vice Chair	
Bruno A. Barreiro		Esteban L. Bovo, Jr.
Jose "Pepe" Diaz		Audrey M. Edmonson
Sally A. Heyman		Barbara J. Jordan
Jean Monostime		Dennis C. Moss
Sen. Javier D. Souto		Xavier L. Suarez
Juan C. Zapata		

The Chairperson thereupon declared the resolution duly passed and adopted this 7<sup>th</sup> day of May, 2013. This resolution shall become effective ten (10) days after the date of its adoption unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

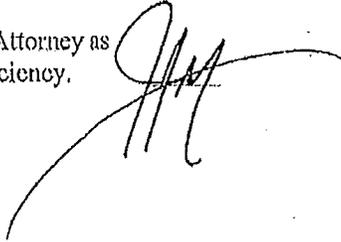
MIAMI-DADE COUNTY, FLORIDA  
BY ITS BOARD OF  
COUNTY COMMISSIONERS

HARVEY RUVIN, CLERK

By: \_\_\_\_\_  
Deputy Clerk

Approved by County Attorney as  
to form and legal sufficiency.

Joni A. Mosely



# Memorandum



**Date:** August 6, 2013

**To:** Honorable Chairwoman Rebeca Sosa  
and Members, Board of County Commissioners

**From:** Carlos A. Gimenez  
Mayor 

**Subject:** Directive Assignment 130999 - Report on the Implementation and Evaluation of Security Devices for Copper Wire Theft Prevention

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During the June 18, 2013 meeting of the Board of County Commissioners (BCC), the Public Works and Waste Management Department (PWWM) was directed to provide a report with a schedule reflecting when and where the specific devices for preventing copper wiring theft of street lighting systems would be installed, and the length of time for the testing period.

## Anti-theft Initiative

As referenced in the "Report on the Feasibility of Implementing Security Devices for Copper Wire and Scrap Metal Theft Prevention" presented to the BCC on June 18, 2013 (Agenda item 2B1), PWWM implemented a pilot test in order to determine the efficacy of an anti-theft device produced by Horsepower Electric, Inc. (HPE), one of Miami-Dade County's (County) current street light maintenance contractors. The pilot test originally contemplated the installation of approximately 400 anti-theft devices at an estimated cost of \$90,000.00, along several of the corridors most impacted by acts of vandalism. This work would be paid from the contingency funds in the County's street light maintenance contract with HPE. The estimated 400 devices were based on the number of lights per corridor and assumed two (2) devices per pullbox. The selected corridors were as follows:

1. NW 7 Avenue from NW 79 Street to 42 Street (107 Street lights)
2. NW 46 Street from NW 6 Court to NW 38 Avenue (68 Street lights)
3. NW 54 Street from Federal Highway to NW 6 Avenue (33 Street lights)

Once work began on the NW 7 Avenue corridor, HPE and PWWM staff determined it was necessary to make repairs to the existing system (e.g., wiring, pullboxes), and to include additional anti-theft devices at intermediate pullboxes (two (2) to four (4) devices per pullbox). This resulted in an estimated increase for the pilot study from \$90,000.00 to \$140,000.00.

The current status for each of the corridors is as follows:

### **1. NW 7 Avenue from NW 79 Street to 42 Street (107 Street Lights)**

This corridor was completed and accepted as of June 7, 2013. A total of 337 devices were installed, which exceeded the anticipated amount by 123 devices. The additional devices were required due to existing intermediate pullboxes, and to address a number of pullboxes which required three (3) or four (4) devices for connections to the opposite side of the roadway.

The costs for this corridor were:

• 337 anti-theft devices at \$225.00 each	\$ 75,825.00
• Replacement of ten (10) damaged wire spans	\$ 9,150.00
• Replacement of 19 damaged pull-boxes	\$ 12,350.00
Total	\$ 97,325.00

**ATTACHMENT B**

The 90 day evaluation period for this corridor ends on September 5, 2013. On June 27, 2013, HPE reported an incident of vandalism along this corridor where the copper wires were cut at three (3) pullboxes in a failed attempt to steal the wires. The system was restored the same day of the report by splicing the affected wires.

**2. NW 54 Street from Federal Highway to NW 6 Avenue (33 Street lights)**

Work within this corridor is complete. A total of 114 devices were installed, exceeding that initially anticipated by 48 devices on account of the number of intermediate pullboxes encountered. During the July 2, 2013 inspections, the Office of the Inspector General (OIG) accompanied PWWM Electricians during the inspection of the installations.

The costs for this corridor were:

• 114 anti-theft devices at \$ 225.00 each (installed)	\$ 25,650.00
• <u>Replacement of nine (9) damaged wire spans</u>	<u>\$ 8,235.00</u>
Total	\$ 33,885.00

HPE has completed all the needed corrections and PWWM inspected and accepted the installations on July 18, 2013. The 90 day evaluation period for this corridor will end on October 16, 2013.

**3. NW 46 Street from NW 6 Court to NW 38 Avenue (68 Street lights)**

This corridor has been removed from the pilot test. PWWM roadway lighting staff inspected this corridor and found that it contains 140 pullboxes, which would require 280 devices. The total number of devices would exceed that initially anticipated for the corridor by 144 devices. Furthermore, this corridor has a large number of damaged wires, which should be addressed prior to the installation of anti-theft devices. Therefore, the work required to install the devices along this corridor would exceed the available capacity of the existing street light maintenance contract with HPE.

Due to the existing intermediate pullboxes and the damage found during the work, the County has installed 451 anti-theft devices at an actual cost of \$131,210.00. As referenced above, PWWM anticipates completion of the evaluation of the pilot study in mid-October, 2013.

PWWM is actively working with the OIG to review these devices, as well as other available products. In addition to these devices and the use of aluminum wire, PWWM has been researching a number of alternatives that are being implemented throughout the United States and other Countries to overcome wire theft. While alternatives such as locking pullboxes and pullbox lids have already been explored in the County; the feasibility of other alternatives such as: direct burial of the cables (i.e., not within a conduit), burial of the pullboxes, solar powered lights, and intelligent lighting systems would also need to be further evaluated. This evaluation would include an understanding of implementation costs as well as long term operations and maintenance costs.

**Recent Thefts**

The County has experienced a more recent wave of vandalism. In March, 2013, 96 spans of copper wire were stolen from the lighting circuits along NE 2 Avenue, from NE 50 Terrace to NE 69 Street. These circuits were re-wired using a combination of aluminum wires and copper grounding wires. Within days of completing the first 20 spans, the copper grounding wire was once again stolen from

each span, while the aluminum wires were left in place. A similar incident occurred on the street lighting along Miami Gardens Drive from NW 38 Avenue to NW 38 Court, where five (5) poles were re-wired using aluminum wires and copper grounding wires. The copper grounding wire from each span was stolen and the aluminum wires left in place. Both systems have since been restored using all aluminum wires.

There has been an arrest of an individual found to have aluminum wire in his possession which matches that used in the County's street lighting systems. However, PWWM has not been able to identify where the wire came from, nor been able to associate the wire to a specific streetlight outage.

The following lighting circuits have been recently vandalized for the copper wire.

LOCATION		DATE OF NOTIFICATION	DATE OF RESTORATION	NUMBER OF COPPER SPANS MISSING
NE 2 AVE	NE 50 TERR - NE 69 ST	3/14/2013	6/4/2013	95
NW 7 AVE	NW 79 ST - NW 117 ST	6/4/2013	6/19/2013	2
NW 12 AVE	NW 71 ST - 81 ST	6/4/2013	6/11/2013	12
MCARTHUR CWSY	PALM/HIBISCUS - WATSON IS.	6/4/2013	7/3/2013	13
NW 79 STREET	I-95 - NW 22 AVE	6/6/2013	6/20/2013	15
Biscayne Blvd	NE 45 ST - NE 49 ST	6/21/2013	6/27/2013	5
Biscayne Blvd	NE 60 ST	7/16/2013	7/17/2013	2
Miami Gardens Dr	NW 38 Ave - NW 38 CT	6/17/2013	6/23/2013	5

In closing, the pilot tests for the HPE anti-theft devices will be concluded in October, 2013, at which time a conclusive determination of their effectiveness can be made. Furthermore, PWWM will continue to work with the OIG to research different methods being implemented to prevent wire theft, and evaluate their usefulness within the County. To date, the use of aluminum wires has proven to be effective. Finally, as part of the four (4) new Streetlight Maintenance Contracts currently being procured, PWWM has included a requirement that the contractor address repeated acts of vandalism by either installing aluminum wires or an approved anti-theft device.

- c: Honorable Harvey Ruvlin, Clerk of the Board  
Robert A. Cuevas, Jr., County Attorney  
Alina T. Hudak, Deputy Mayor  
Kathleen Woods-Richardson, Director, Department of Public Works and Waste Management  
Christopher Agrippa, Division Chief, Clerk of the Board  
Patra Liu, Inspector General