Utilities Maintenance Plan

Truckee Tahoe Airport District

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Introduction

The Truckee Tahoe Airport has been in its current location since the early 1960's. Hangars 1 and 2 were constructed in the mid 1960's; the warehouse, car rental building and Hangar Rows B, C and J were constructed in the 1970's. In the 1980's Hangar Rows A, D, E, F, G, K and the Civil Air Patrol Hangar were erected followed by the Vehicle Maintenance Building and fuel tank farm in the 1990's. Hangar Rows L and M were built in the mid-2000's and the Administration Building was completed in 2012. As buildings, taxiways, runways and the ramp area were added/expanded over the years, the utility infrastructure system footprint and capacity were increased to serve those new facilities. The District owns and maintains the following types of utility systems:

- domestic drinking water and fire protection
- sanitary sewer collection including on-site disposal at two buildings
- storm drain collection and discharge
- power distribution
- communications

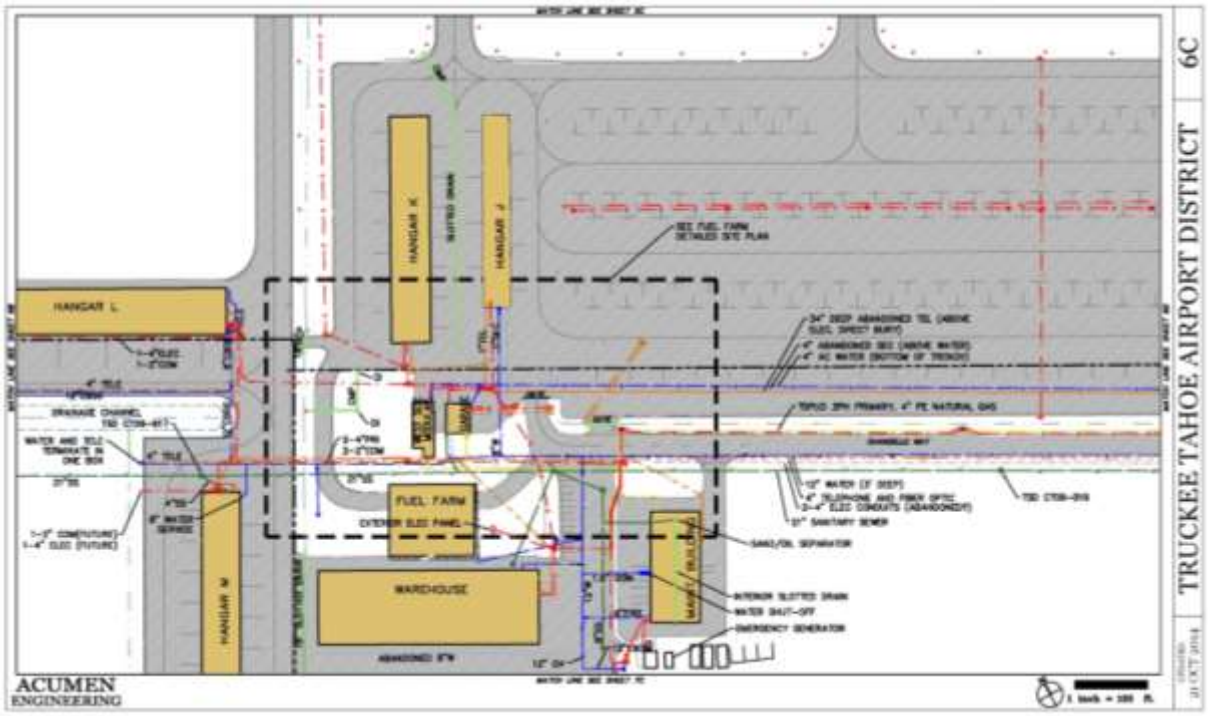
The District requested Acumen Engineering prepare a Utilities Maintenance Plan that includes the following components:

- compile a Master Map of all utility infrastructure
- identify deficiencies (due to age or capacity)
- develop maintenance strategies
- quantify the required work both in terms of cost and timing

Master Mapping

Acumen Engineering met with District Staff to review all available as-built construction drawings dating from the 1970's and used those plans to compile utility information for the entire airport property into a Master Map file created in AutoCAD. The mapping is divided into a 22-page base grid system, supplemented by pages providing detail (increased scale) in areas with a significant amount of infrastructure (i.e. congested) and of individual systems such as ramp lights to allow trouble-shooting and/or operation. Once the initial mapping was complete, airport staff was tasked with reviewing the drawings to correct the information based on actual field locations and "institutional knowledge". This process was repeated twice, the result being the mapping is considered accurate with respect to the location of underground infrastructure, the size and material of the pipe or conduit and the connecting surface feature (i.e. valve, manhole, pull-box, etc.). An in-pipe video inspection of the interior of representative sanitary sewer and storm drain pipes was conducted to both assess the condition of the pipes and provide information on the location of branch and lateral sanitary sewer connections to the mainlines. Excavation of the oldest domestic water laterals to determine their location,

materials and condition was also done. The digital map file was provided to the firm providing Geographic Information System (GIS) services to the Airport and imported into the District's ESRI software. The end result is utility information is available to Staff both digitally and in the form of a paper "Map Book" that can be carried in each vehicle to assist Operations and Maintenance Staff with their daily duties. The mapping can and will be very helpful for project planning purposes to understand utility availability for new structures and potential conflicts that may be expected during construction. Development of a naming/labeling protocol for each piece of infrastructure has been initiated but is not complete; the potential use of a facility maintenance software program should be researched and facility identification compatibility verified before the assignment of individual utility component identification tags is complete.



Sample System Map Page

While the mapping is considered accurate, it is only as good as the original source of the documentation (as-built construction drawings and employee memory); the location information must be continuously updated whenever the opportunity arises either as part of new construction or maintenance of the existing systems.

Domestic Water and Fire Protection System:

Description: The airport's water distribution system is served by two connections to the Truckee Donner Public Utility District (TDPUD) system; one is directly south of the Administration Building and the other is just west of the Vehicle Maintenance Building. Both connections are equipped with a usage meter, pressure reducing valve station and backflow device. The

airport's system is comprised of approximately 10,000-feet of four to 12- inch diameter pipelines made of a variety of materials; the newer (1980's-current) pipes are Polyvinyl Chloride (PVC) while the older (1960's-early 1980's) are Asbestos-Cement (AC). There are 18 fire hydrants and four buildings have fire sprinkler systems (Administration, Vehicle Maintenance and Hangars L&M). The distribution system contains 20 in-line valves (not including those specifically for buildings or hydrants) that can be used to isolate individual sections of network. The expected service life of these pipelines, valves and hydrants is 60-80 years assuming reasonable initial construction methods, consistent pressure and regular maintenance/exercising (hydrants and valves). Domestic water is supplied to nine buildings (Administration, Vehicle Maintenance, Warehouse, Hangar 1, Hangar 2, EAA, Car Rental, Careflight Modular and Hangar M). Recent exploratory potholing at Hangars 1 and 2 indicated that the 50 +/- year old copper and galvanized lateral materials used to supply water to those buildings (and EAA) are likely near the end of their useful life. The glider port is served by an on-site well that was drilled and is operated/maintained by the concessionaire.

Water System Valves

Suggested Water System Improvements and Maintenance:

1. Replacement of the service laterals supplying Hangars 1 and 2 and EAA. The pipe material is recommended to be High Density Polyethylene (PE) with a tracer wire and new valves should be installed to allow complete shutdown of each building. The lateral connections should be made at the mainline with a new service saddle and corporation stop; stop and drain valves should be installed to allow the building piping to be drained when the structure is not occupied. Exterior hose bibs, if desired, should be provided as part of the building's interior plumbing and not as a branch of the building's service.
2. All mainline, fire hydrant and building service valve boxes should be cleaned and the valves exercised at least bi-annually. This preventative maintenance effort will ensure the valves are accessible and functional when circumstances require. If a building's shutoff valve cannot be located, a new valve should be installed.

3. Fire hydrants should be exercised annually to ensure they shut-off completely and that flows are not reduced by an inadvertently closed mainline valve in the distribution network. This maintenance also flushes the system removing sediment from valve seats that could preclude a valve from closing tight.

Sanitary Sewer System:

Description: The airport's sanitary sewer collection system connects to the Truckee Sanitary District (TSD) 21-inch diameter interceptor on the south side of Chandelle Way at three locations; near the intersection of Airport Road and Chandelle Way, near the intersection of Aviation Way and Chandelle Way and Hangar M is directly connected. The collection system consists of approximately 1,150 lineal feet of four and six inch diameter primarily PVC pipelines. There are six manholes, eight building cleanouts, a grease trap for the kitchen in the Administration Building and a sand/oil separator pre-treating waste from the floor drains in the Vehicle Maintenance Building. Sanitary sewer service is provided to the same nine buildings that have domestic water service with the exception that Hangar 1 and the EAA Building each have a 500 gallon septic tank and leach field in lieu of being connected to the collection system. The previously described video inspection of a portion of the system showed the pipelines were in good structural condition with no apparent cracks, shear breaks or lateral off-sets. However, access to some pipelines was difficult due to missing building cleanouts and/or partial blockage caused by solids deposition (both rocks/dirt and waste) and the majority of the pipelines exhibited a build-up of FOG (fats, oils and grease) and/or other non-human waste on the walls or flowline. The Hangar 1 and EAA septic tanks were cleaned; visual inspection of the tanks did not indicate a degraded condition and the respective leach fields reportedly function properly, i.e. no backups or surface daylighting of effluent. The glider port is served by an on-site septic system that was constructed and is operated/maintained by the concessionaire.

Interior of sanitary sewer pipe serving Administration Building

Interior of sanitary sewer pipe serving Vehicle Maintenance Building

Suggested Sanitary Sewer System Improvements and Maintenance:

1. No sanitary sewer infrastructure replacement is proposed, the condition of the pipelines and manholes is considered good to very good.
2. All building cleanouts should be located, repaired as necessary and a box installed to provide protection from damage and ease in locating.
3. The entire system should be cleaned on a bi-annual interval to reduce the possibility of a Sanitary Sewer Overflow (SSO).
4. The grease trap and sand/oil separator pre-treatment vaults should be cleaned on an as-needed basis based on an annual visual inspection and as required by the TSD.
5. The septic tanks should be pumped on a maximum four-year interval with the EAA building potentially requiring a more frequent interval due to the number of users. A visual inspection of the tanks should be done at least annually to confirm the level of solids. Signage should be posted in the two buildings to remind the users of the types of materials that can be discharged to the system (paper only) and that under no circumstances should chemicals be disposed of in the system.
6. The District may consider entering into a "Private Sewer Maintenance Agreement" with the TSD which requires pressure/leak testing of all parts of the system on an eight-year rotation.

Storm Drain Collection System:

Description: The airport's storm drain collection system consists of slightly less than 10,000 lineal feet of 12 through 24-inch diameter pipelines, the majority of which is Corrugated Metal Pipe (CMP) with limited amounts of High Density Polyethylene (HDPE) and Reinforced Concrete (RCP). Other components include 44 drainage inlets, slotted drains between Hangar Buildings: A/Jet Ramp, B/C, C/D, D/E, E/F and G/H, along the south side of the ramp in the vicinity of Hangar 2 and the Administration Building and on the south and west sides of the warehouse, two slide gates that are closed when the self-serve island is filled (to contain a fuel spill) and two 500-gallon overflow containment structures at the fuel farm. The previously described video inspection of a portion of the system showed the pipelines were in good structural condition with no apparent corrosion or structural issues however most were at least partially filled with debris. The collection system discharges to basins/swales located on undeveloped portions of the airport property (generally at the end of each runway) where the runoff infiltrates into the ground. This discharge is allowed through an Industrial Stormwater Discharge Permit issued by the Lahontan Regional Water Quality Control Board; District staff submits monthly wet-weather and quarterly dry-weather reports to the Board.

Storm Drain Pipe and Slide Gate

Suggested Storm Drain Collection System Improvements and Maintenance:

1. No storm drain infrastructure replacement is proposed. The condition of the pipelines and drainage inlets is considered good to very good with the exception of the slotted drain between Hangar Buildings G and H which is planned for replacement in 2015 when that taxilane is reconstructed. The condition of the remaining infrastructure should be assessed whenever repairs to the overlying pavement are planned.
2. The pipe and drainage swale network should be inspected annually and cleaned of rocks and sediment when necessary to maximize flow capacity. Accumulated sediment and

organic matter should be removed from the bottom of drainage inlets in spring of each year.

3. The drainage inlets installed as part of the construction of the Administration Building include a sediment and petroleum filter insert, these devices should be serviced in accordance with the procedures and timing recommended by the manufacturer.
4. The overflow containment structures at the fuel farm should be visually inspected at least annually to ensure maximum capacity and functionality.

Power Distribution System:

Description: The power distribution system is a combination of airport owned and Truckee Donner Public Utility District owned infrastructure. The TDPUD is responsible for the distribution of power through vaults, switches, transformers, conduit and conductors up to the meter (referred to as the Service Entrance). Downstream of the meter, the airport owns and maintains indoor and outdoor power conduits, conductors, pull-boxes, panels and fixtures. The condition and required improvements to the building systems, including sub-panels, was described in the Facilities Management Plan. The Airport's exterior equipment consists of conduits, conductors and sub-panels serving adjacent buildings (in most cases only every other hangar has a Service Entrance) and airfield improvements such as ramp and runway lighting, the AWOS, segmented circle, runway end identification lights (REIL), precision approach path indicator lights (PAPI) and the rotating beacon. The airport has two diesel and one gasoline powered emergency generators; one powers the Administration Building (portion), rotating beacon, segmented circle, self-serve fuel island and runway lighting. The second generator is located near the Vehicle Maintenance Building and powers a portion of the circuits in that facility while the third supplies the Careflight Modular building. According to available records and staff knowledge, all original airport owned direct-bury power conductors have been replaced with conduit encased cables and all pull-boxes and vaults appear to be in good structural condition. The ramp lights were replaced in 2013 and the runway lighting system in 2012. The ramp lighting is controlled either manually or by photo-voltaic sensors mounted on a sub-panel located near the front of Hangar 1 and at the top of each pole. Each installation has more than one light fixture and the number of lights that operate at any one time is manually controlled by switches at the pole. Mounted on each of the light poles is a power receptacle that is used during events such as the Airshow and for aircraft engine heaters; staff has indicated these circuit(s) typically trip when used, an investigation is recommended to correct the problem (wire or breaker size is suspected). The runway, beacon and segmented circle lighting is powered by a sub-panel located in the emergency generator building. The runway lights' on/off function is controlled by either Unicom or a pilot if the airport is unmanned; the intensity is controlled by Unicom.

Power Distribution Panels

Suggested Power System Improvements and Maintenance:

1. No power distribution infrastructure replacement is proposed
2. The receptacle capacity issues on the ramp light poles should analyzed and repairs/upgrades made.
3. All at-grade pull-boxes should be inspected at least annually, prior to snow removal activity, to confirm the lids are secure and that the conductors are accessible.
4. Label the exterior of all above-ground panels and sub-panels with the operating voltage, source of the power and the building/system served. The information, other than voltage, can be attached to the inside of the panel door if security concerns warrant. Individual breakers should identify the fixture(s) supplied by each circuit. Note: Staff must be trained and equipped with the appropriate Personal Protective Equipment (PPE) before working on any electrical panel or enclosure when the conductors are exposed.

Communication System:

Description: The airport's communication system is a combination of ATT (telephone) and district owned and maintained infrastructure. ATT provides wired telephone service to the following buildings; Administration, Vehicle Maintenance, Warehouse, Hangar 1, Hangar 2, Hertz and the Careflight Modular. The District's communication network connects the Administration Building to remote systems such as card operated access gates, self-serve fuel point-of-sale, hangar fire alarms, security cameras, the AWOS and flight tracking. As with the power system, all cables are contained within conduit and pull-box systems, no direct-bury cabling is being used. The connection between the Administration and Vehicle Maintenance Buildings is through a fiber-optic cable, the remaining cables are copper.

Communication and Power Pull-Boxes

Suggested Communication System Improvements and Maintenance:

1. No communication infrastructure replacement is proposed
2. All at-grade pull-boxes should be inspected at least annually, prior to snow removal activity, to confirm the lids are secure and that the cables are accessible.
3. Label all cables entering and leaving at-grade pull-boxes with the building/system served.
4. Label all above-ground enclosures, inside or outside the cabinet, with the building/system served

Suggested Timing and Budget Implications

The Airport's utility infrastructure appears to be in very good condition, is well maintained and accessible. Other than the suggested replacement of the domestic water service laterals to Hangars 1 and 2 and the EAA Building within the next two or three years, no deficiencies or conditions warranting replacement were noted during our investigation. As described in the individual system narratives, there a number of recommended enhanced maintenance procedures:

- further exploration and confirmation of underground utility locations and regular updates of the mapping
- regular inspection, operation and cleaning of the individual components (above and below grade) to ensure the system can function to its maximum capacity or conversely be isolated when necessary
- labelling of power and communication equipment panels, enclosures and cables to facilitate system trouble-shooting and improve mapping of system components

The majority of the maintenance work does not require specialized training or equipment and could be done by Airport Staff if work load/schedule permits. Outside vendors/contractors will likely be necessary for the following tasks:

- semi-annual mapping updates: $1,500/year
- replacement of three water service laterals: $3,000 each, one-time expense
- cleaning of sanitary sewer system with vacuum/hydroflush equipment: $3,000 every other year
- pump grease trap and sand/oil separator pre-treatment vaults: $2,000/each every two years
- pump Hangar 1 and EAA septic tanks: $1,000 each every four years
- analysis and upgrade of ramp lighting receptacle capacity: $7,500, one-time expense

Over a 10-year period the cost of maintenance performed by outside contractors totals slightly more than $70,000 or approximately $7,000/year.