Appendix H

Policies

General Facilities

Policy C – Over Depth Adjustments

Clark Regional Wastewater District
2015 General Sewer Plan – Policy Analysis
Policy C – Over Depth Adjustments

Statement

Should the District develop a policy that defines the District's financial contribution to a Developer's over depth installation?

Current District Policy (see Resolution No. __)

.

Policy for Consideration

B?"

Policies of Other Sewering Agencies

Southwest Suburban Sewer District: .

Alderwood Water and Wastewater District (AWWD): .

City of Puyallup: .

King County:.

Kitsap County: .

Lakehaven Utility District:

Policy Discussion and Analysis

:

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Advantages / Disadvantages

Pro:	Con:
1. Less 2. 3.	1. events 2. unfair.

Impacts

Financial:
Environmental:
Customer: service.

Recommendation

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Policy D – Financial Contributions for Over Sized Infrastructure

Clark Regional Wastewater District
2015 General Sewer Plan – Policy Analysis
Policy D – Financial Contributions for Over Sized Infrastructure

Statement
Should the District develop a policy that defines the District's financial contribution to a Developer for the installation of over-sized infrastructure?

Current District Policy (see Resolution No. __)
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Policy for Consideration
B?"

Policies of Other Sewering Agencies
Southwest Suburban Sewer District: .

Alderwood Water and Wastewater District (AWWD): .

City of Puyallup: .

King County:.

Kitsap County: .

Lakehaven Utility District:

Policy Discussion and Analysis
Oversized lines typically are those in excess of eight (8) inches in diameter. Any reimbursement for oversizing shall be determined in accordance with Chapter 5.36 of the CLARK REGIONAL WASTEWATER DISTRICT Code and by the Board of Commissioners by motion prior to the start of construction. The nature and extent of the oversizing as approved by the Board is shown in the attachment, which is by this reference made a part of this Agreement.:

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Advantages / Disadvantages

Pro:	Con:
1. Less 2. 3.	1. events 2. unfair.

Impacts

Financial:
Environmental:
Customer: service.

Recommendation

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Resolution No. 1642

Interim Pump Stations

CLARK REGIONAL WASTEWATER DISTRICT
CLARK COUNTY, WASHINGTON
RESOLUTION NO. 1642

A RESOLUTION OF THE BOARD OF COMMISSIONERS OF CLARK REGIONAL WASTEWATER DISTRICT, CLARK COUNTY, WASHINGTON, ADOPTING THE CLARK REGIONAL WASTEWATER DISTRICT INTERIM PUMP STATION POLICY; AND AUTHORIZING THE GENERAL MANAGER TO MAKE CERTAIN CHANGES TO THE INTERIM PUMP STATION POLICY.

WHEREAS, the Board of Sewer Commissioners recognizes the District's responsibility to ensure the proper expansion of the sewer system in accordance with the adopted Comprehensive General Sewer Plan (Plan); and

WHEREAS, the District also recognizes that the Plan is not always feasible due to the timing and logical progression of the projects. In these situations, allowing effective interim solutions are vital to the overall economic health of the community and ultimately achieving the long-term vision of the Plan; and

WHEREAS, The purpose of the Interim Pump Station Policy is to establish objective criteria as a basis for approving the construction of interim sanitary sewer pump stations in-lieu of constructing the permanent offsite gravity sewer system as described in the District's Plan; NOW, THEREFORE

BE IT RESOLVED by the Board of Commissioners of Clark Regional Wastewater District, Clark County, Washington, as follows:

Section 1. The Interim Pump Station Policy for the Clark Regional Wastewater District as presented by district staff is adopted as set forth in Exhibit "A", attached to this resolution.

Section 2. The general manager is authorized to amend the Interim Pump Station Policy to implement new or changed laws and regulations, and to clarify language, without formal Board action. The general manager will provide a copy of the amendments to the Board at the regular Board meeting following their adoption and to the board clerk for filing.

ADOPTED by the Board of Commissioners of Clark Regional Wastewater District of Clark County, Washington, at a regular meeting held on March 24, 2015.

CLARK REGIONAL WASTEWATER DISTRICT

Attest:

Norm Harker, Secretary

Neil Kimsey, President

Denny Kiggins, Vice President

CLARK REGIONAL WASTEWATER DISTRICT
INTERIM PUMP STATION POLICY

Policy #POL-001 **Effective: 03/24/15**

Exhibit "A"

Purpose

The Clark Regional Wastewater District (District) recognizes its responsibility to ensure the proper expansion of the sewer system in accordance with the adopted Comprehensive General Sewer Plan (Plan). The District also recognizes that the Plan is not always feasible due to the timing and logical progression of the projects. In these situations, allowing effective interim solutions are vital to the overall economic health of the community and ultimately achieving the long-term vision of the Plan. The purpose of this policy is to establish objective criteria as a basis for approving the construction of interim sanitary sewer pump stations in-lieu of constructing the permanent offsite gravity sewer system as described in the District's Plan. All interim pump stations must be approved by the Board of Commissioners.

Personnel Affected

Engineering staff.

Policy

The following criteria shall be considered in approving or denying a proposed Interim Pump Station:

Regardless of easements, if the cost of the permanent offsite gravity sewer exceeds the typical cost to construct a 1,500-feet sewer extension within a paved roadway, as determined by the District (currently approximately $450,000), the Developer may choose to construct an interim pump station.

If the permanent gravity sewer requires acquisition of more than three easements from three separate property owners, the Developer may choose to construct an interim pump station. Otherwise, the Developer shall pursue, in good faith, the acquisition of the required easements at no cost to the District. If the easements cannot be acquired by the developer, the District may choose to use its powers, including condemnation, to acquire easements at the Developer's expense.

In any case, the Developer or the District may choose to pursue a Developer Reimbursement Agreement, or other such agreement, pursuant to constructing the permanent gravity sewer. At two-times the cost of a typical 1,500-feet sewer extension, a typical agreement may include a 50% District participation and splitting the latecomer proceeds 50/50. However, other arrangements are possible and will be reviewed on a project-specific basis.

If an interim pump station is approved, the Developer shall pay the District $30,000 for two years of operations' expenses ($10,000 per year) and future decommissioning costs ($10,000) associated with the interim pump station.

Attachment: Clark Regional Wastewater District Interim Pump Station Policy Decision Chart

REVIEWED:

C1-1.3.1 “To and Through Policy"

C1-1.3.1 “To and Through Policy"

A. Within Right-of-Way. Where the service parcels will be served by a collection line in right-of-way abutting the service parcels, the owner shall construct the collection line across the entire length of the abutting right-of-way; provided, that the owners of the last three parcels that can be served by such collection line, as determined by the District Engineer, shall construct collection lines of three equal lengths, as determined by the District Engineer; and provided further, that the owners of the last two parcels that can be served by such collection line, as determined by the District Engineer, shall construct collection lines of two equal lengths, as determined by the District Engineer.

B. Within Service Parcels. Except as provided in subsection E of this section, the owner, when constructing the collection line within the service parcels, shall construct extensions of the collection line and provide easements to serve adjacent parcels that can be served by the collection line.

C. To Sewer Corridor. When constructing the collection line, and its extensions if any, in accordance with subsections A and B of this section, the owner shall extend the collection line, and its extensions if any, to the sewer corridor of any additional right-of-way that abuts the service parcels and connects with the abutting right-of-way in which the collection line is located. The sewer corridor shall be seven feet south or west of the centerline of the right-of-way, as applicable.

D. Determination of Adjacent Service. The District Engineer shall determine whether an adjacent parcel can be served by the collection line in the service parcels, considering the District’s comprehensive plan, the topography in the vicinity, the pattern of development in the vicinity, and the existing and proposed sanitary sewer systems and lines that are not contained in the District’s comprehensive plan.

E. Single-Family Residence. Where (1) the collection line for the service parcels provides sewer service to a single-family residence or residences, (2) the service parcels can be further subdivided or developed under zoning regulations and (3) the adjacent parcel can be served by the collection line, the owner may extend the collection line through fifty percent of the service parcels and provide an easement to the adjacent parcel, in a location and size as determined by the District Engineer. Upon approval of a preliminary plat or issuance of a development permit, the owner shall construct the collection line in the easement.

F. Location of Lines and Easements. The District Engineer shall determine the locations and types of collection lines and the locations and sizes of easements, and may require review of the collection line installation.

G. Finality of Decision. The decisions of the District Engineer pursuant to this section shall be final.

Policy A – Design Storm

Clark Regional Wastewater District
2015 General Sewer Plan – Policy Analysis
Policy A – Design Storm

Statement
Should the District identify a storm event to which the infrastructure is designed?

Current District Policy (see Resolution No. __)
The District's current policy implies that a piping system is considered at full capacity when flow reaches the crown of the pipe. The District's Design Manual states:

> "Sanitary sewers shall be designed to carry at least the peak hourly flow when operating at capacity. Peak hourly flow shall be the design average daily flow in conjunction with a peaking factor in the District General Sewer Plan. The peaking factor shall not be less than 3.0 for subdivisions and as calculated for all other uses."

The stated peaking factor is intended to account for increased flows due to storm events but is not directly linked to a specific design storm.

Policy for Consideration
Various components in the District are design to differing flow conditions. For instance, pump stations are designed to convey peak hour flows with the largest pump out of service. Gravity interceptors and trunk lines are designed to convey peak hour flows without exceeding the surcharging allowance in Policy B. The WWTP is expected to meet the monthly and weekly NPDES limits without bypassing the plant.

This policy question deals with defining the rainfall event and resulting flow conditions that are generated from the storm event. Another way of addressing this question is "At what frequency can the District tolerate exceeding of the surcharging criteria presented in Policy B?"

Policies of Other Sewering Agencies
Southwest Suburban Sewer District: 20-year flow recurrence interval.

Alderwood Water and Wastewater District (AWWD): 20-year flow recurrence interval.

City of Puyallup: 25-year rainfall recurrence interval which matches with their stormwater standards.

King County: 20-year flow recurrence interval.

Kitsap County: 20-year flow recurrence interval.

Lakehaven Utility District: 20-year flow recurrence interval

City of Vancouver: An earlier GSP used a 5-year storm event. The more recent GSP focused on both the 5-year and a 25-year storm event for modeling. The basis for retaining the 5-year storm was unclear.

Policy Discussion and Analysis

It is recognized that storms of greater intensity (but occurring at less frequency) will result in flow conditions in excess of the design storm event.

The pivotal policy question is risk aversion. For example, an annual excursion over the surcharging threshold is too frequent and would have severe environmental and customer impacts. Conversely, a design storm with a recurrence period of 100 years would result in significantly over designed infrastructure and the resulting financial burden to the rate payers.

Current thinking is that a recurrence interval of 20 to 25 years is commonly viewed as an acceptable inconvenience and associated risk. However, each sewering agency has varying tolerances for such risk. That is to say that rain in excess of this threshold will result in deeper surcharging, not necessarily in an immediate overflow event. Overflow or flooding events are dependent on the depth of sewer and sewer connections.

Some agencies classify their surcharging into 4 categories:

- Class 1 – pipe is not surcharging
- Class 2 – pipe is surcharging but within the District's conditional surcharging limits
- Class 3 – pipe is surcharging below the manhole rim elevation but exceeds the District's surcharging criteria
- Class 4 – surcharging exceeds the manhole rim elevation and the potential for sanitary sewer overflow exists

Class 1 and 2 conditions require no action. Class 3 condition requires close evaluation of finished floor elevations to ensure the flow does not backup into the structure. Class 4 conditions may result in either backup into the sewered structures or overflow through the manhole lid. Finish floor elevations of the sewered structures that are lower than the street elevation (i.e. the manhole rim) are likely to be flooded unless proactive measures such as backflow preventers or check valves are installed.

Advantages / Disadvantages

Pro:

1. Less conservative design events translate into a reduced CIP
2. Reduced budget and rate impacts
3. Provides periodic higher flushing velocities

Con:

1. Potential for exceeding surcharging threshold in extreme storm events
2. A change in capacity analysis may be viewed by those that were subject to the prior capacity limits as unfair.

Impacts

Financial: Reduced CIP ➔ reduced capital costs and reduced impacts on rates
Environmental: Storm events greater than the design storm may result in the exceeding the surcharging allowances. Under extreme conditions this may result in surfacing of wastewater through over surcharged manholes or surfacing through lowest sewered service.
Customer: Reduced capital costs which translates to reduced monthly user fees. Potential for backup through lowest service.

Recommendation

Define the design storm as a 25-year recurrence event.

Policy B – Allow Surcharging in Trunk and Interceptor Sewers

Clark Regional Wastewater District
2015 General Sewer Plan – Policy Analysis
Policy B – Allow Surcharging in Trunk and Interceptor Sewers

Statement
Should the District allow surcharging in the trunk and interceptor sewers?

Current District Policy (see Resolution No. __)
The District's current policy implies that a piping system is considered at full capacity when flow reaches the crown of the pipe. The District's Design Manual states:

> "Sanitary sewers shall be designed to carry at least the peak hourly flow when operating at capacity. Peak hourly flow shall be the design average daily flow in conjunction with a peaking factor in the District General Sewer Plan. The peaking factor shall not be less than 3.0 for subdivisions and as calculated for all other uses."

The stated peaking factor is intended to account for increased flows due to storm events but is not directly linked to a specific design storm (See Policy A – Design Storm).

It is recognized that storms of greater intensity (but occurring at less frequency) will result in flow conditions in excess of the design storm event. Consequently, surcharging greater than the allowance may occur during larger storm events.

Policy for Consideration
The District is considering allowing the piping systems to have surcharging conditions in the gravity trunk and interceptor pipes during the design storm events (See Policy A – Design Storm). This means that sewage will be allowed to surcharge over the crown of the pipe to a depth equal to the pipe diameter. This is also sometimes referred to as the hydraulic grade line. Surcharging in the 8-inch collection pipes would not be allowed.

Policies of Other Sewering Agencies
Southwest Suburban Sewer District: Allowable surcharge equal to 100% of pipe diameter over crown of pipes.

Alderwood Water and Wastewater District (AWWD): For pipes less than 10 feet below grade an allowable surcharge of one foot above crown of pipe. For pipes greater than 10 feet below grade an allowable surcharge of three feet above the crown of the pipe.

City of Puyallup: Allowable surcharge equal to 100% of pipe diameter over crown of pipes.

City of Monroe: Allowable surcharge equal to 100% of pipe diameter over crown of pipes.

Kitsap County: No surcharge allowed. Design point at 95% of pipe diameter.

City of Lynnwood: "Minor surcharging" allowed on a case-by-case basis. Minor surcharging not defined.

City of Vancouver: The City has two criteria. A) If the freeboard is less than 8 feet and has a surcharging condition that is less than 1 foot – the installation is to be monitored to evaluate the need for a CIP and B) No CIP required if the freeboard is greater than 8 feet.

Policy Discussion and Analysis

Prior and traditional design standards, which have been followed for decades, have conservatively specified that collection and conveyance systems should be designed to transport flows when the peaking factor is applied. This methodology was commonly followed in the pre-hydraulic model period. The selection of the peaking factor is typically influenced by the collection area and populations, but is neither tied to a storm weather event nor the dampening effect of conveying the flows over long distances. These factors all contribute to conservatively designed systems which translates to large Capital Improvement projects. More recently many larger sewering agencies have investigated and implemented a storm event-based, hydraulic model with surcharging allowance. This has resulted in more realistic characterization of the sewer system and significantly reduced CIP.

The 100% surcharge allowance used by some of the cities listed above is a good approach to refining the required CIPs. This approach reflects the current thinking that the infrastructural improvements to the conveyance systems should be linked to a storm event and recognizes that system is design for those conditions. By allowing surcharging during these high flow events, the previously unused capacity in the interceptors and trunk lines is recaptured. The 100% surcharge allowance, however, does not address the depth of the system and the ability or inability to contain flows during high flow events.

The approached used by AWWD addresses the fact that deeper pipes have additional freeboard and can accommodate greater surcharging. Their policy was established prior to their 2000 General Sewer Plan and has remained unchanged since that time. Though some surcharging has exceeded their thresholds during the last 15 years, their position is that the minimal excursions have not resulted in significant adverse environmental or customer impacts.

Advantages / Disadvantages

Pro:

1. Reduced CIP
2. Reduced budget and rate impacts
3. Provides periodic higher flushing velocities

Con:

1. Potential for exceeding surcharging threshold in extreme storm events
2. A change in capacity analysis may be viewed by those that were subject to the prior capacity limits as unfair.

Impacts

Financial: Reduced CIP ➔ reduced capital costs and reduced impacts on rates
Environmental: Storm events greater than the design storm may result in the exceeding the surcharging allowances described. Under extreme conditions this may result in surfacing of wastewater through over surcharged manholes.
Customer: Reduced capital costs which translates to reduced monthly user fees

Recommendation

Implement an allowable surcharge for interceptors and trunk lines as follows:
For pipes less than 10 feet below grade an allowable surcharge of one foot above crown of pipe. For pipes greater than 10 feet below grade an allowable surcharge of three feet above the crown of the pipe.

Policy G – Industrial Zoning

Clark Regional Wastewater District
2015 General Sewer Plan – Policy Analysis
Policy G – Industrial Zoning

Statement
Should the District develop a policy that addresses the establishment of an industrial zone in certain areas to account for the uncertainty of flow generation?

Current District Policy
Per the District's 2010 *Design Manual*, industrial design flows are determined on an individual review basis. Conversely, future projected sewer flows for industrial zones were accounted for in the District's 2013 General Sewer Plan using an average annual flow rate of 1,800 gallons per acre per day (gpad).

Policy for Consideration
The District will be extending sanitary sewer service to the approximately 670-acre area of industrial-zoned land titled "Land Bank". A strategy must be developed to account for the sewer flows generated within the Land Bank area and introduced to existing sanitary sewer infrastructure.

This policy addresses the question of how to account for the additional sewage flows associated with the Land Bank area that will be incorporated into the District's sewer system. More specifically, how these additional sewage flows from the Land Bank area will be quantified and in what units.

Policies of Other Sewering Agencies
City of Centralia: Sierra Pacific Industries' Centralia lumber manufacturing facility is 41-acres of sawmill industrial land that processes its own wastewater prior to discharging into the City's sanitary sewer system. The SPI facility discharges as a peak-day rate of 26,880 gpd, which translates to a flow rate of approximately 700 gpad.

City of Puyallup: The City identifies three industrial dischargers into its sanitary sewer system: Cintas, Unifirst, and Air Products. The respective average daily discharge flow rates of each user are 19,000 gpd, 30,000 gpd, and 10,700 gpd, per the City's 2016 Comprehensive Sewer Plan. Estimating the areas of each complex, the wastewater flow contributions of each in units of gpad can be respectively approximated as 2,000 gpad, 7,500 gpad, and 3,000 gpad.

King County: An industrial flow rate of 55 gallons per employee per day (gped) is used for sanitary sewer flow forecasting for future industrial zones, per the 2014 *Updated Planning Assumptions for Water Flow Forecasting*. The County assumes that industrial employees generate the same flow per employee as commercial employees, plus an additional amount from industrial process water usage.

Kitsap County: The Port of Bremerton provides sewer service to two light industrial users, the Bremerton National Airport and the Olympic Industrial Park. Flow contributions from industrial areas in the Port of Bremerton are monitored and per capita rates (35 gped average daily flow in peak month) are calculated from recorded data.

City of Ellensburg: The City of Ellensburg has one significant industrial user, Twin City Foods, a vegetable processor. It produces an average of approximately 38,000 gallons per day (gpd) of wastewater, which translates to roughly 2,750 gpad (per the City's 2015 *Wastewater Treatment Facility Engineering Report*).

City of Wooldand: Walt's Wholesale Meats is an industrial user that discharges to the City's sewer system. Walt's discharged a max month flow of 24,000 gpd, but recently acquired an additional 66,000 gpd max month discharge capacity due to the company expanding and increasing production. This translates to an approximate 10,000 gpad max month discharge rate.

Policy Discussion and Analysis

Industrial wastewater discharge rates are difficult to predict because the flows vary significantly depending on the type of industry. The key to estimating future wastewater flow rates within the Land Bank area is anticipating what type of industry (light producing minimal wastewater, heavy producing significant wastewater, etc.) will populate the area. For example, a paper mill will require large quantities of water and hence generate high wastewater flows compared to a lumber manufacturing or other light industrial facility. This Policy will assume the industry within the Land Bank will be light-to-medium industrial, in part because of the existing wastewater treatment plant and collection system capacities and also because the Land Bank area is unlikely to accommodate heavy industry. Should any heavy industrial user capable of producing large quantities of wastewater desire to locate in the Land Bank area, the District should carefully review the industry to determine if the existing collection system and treatment plant can accommodate the additional flows and loadings.
Another consideration is what units to apply to Land Bank industrial wastewater projections. Gped is a viable alternative, but it is difficult to anticipate the number of employees in each industry. Furthermore, employees do not constitute all of the wastewater production in industries; industrial processes constitute a significant portion as well. For this reason, units of gpad is typically used in industrial wastewater flow projections and will be used for this Policy.
Comparing industrial wastewater flows in the Southern Washington region indicates that typical non-heavy average annual industrial flow is approximately 3,000 gpad.

This value is two-thirds larger than the 1,800 gpad used in the District's 2013 General Sewer Plan. This is a justifiable increase, given the uncertainty regarding the type of industry that will populate the Land Bank region. Hence, a projected average annual industrial flow rate of 3,000 gpad will be used for the Land Bank area.

Advantages / Disadvantages:

Pro:

1. Assuming light-to-medium industry means a less conservative flow rate estimate, which translates into a reduced CIP.
2. Reduced capital costs and rate impacts.
3.

Con:

1. Potential for surcharging if heavy industrial users populate Land Bank.
2.

Impacts

Financial: Overestimating the industrial wastewater design flows would result in oversizing infrastructure and having a larger CIP, and hence higher capital costs and rates. Underestimating the projections would result in undersized infrastructure and resulting surcharging, which would lead to costly sewer main replacements and would impact capital costs and rates as well.

Environmental: Underestimating industrial design flows may result in exceeding the surcharging allowances. Under extreme conditions this may result in surfacing of wastewater through over surcharged manholes or surfacing through lowest sewered service.

Customer: Industrial users are billed based on water consumption; therefore, current sewer customers should not realize rate increases due to the equitable rate structure. However, increased capital costs due to overestimating or underestimating the design flows (as discussed above) may impact sewer service rates.

Recommendation

Use an average annual wastewater discharge rate of 1,500 gpad to project future industrial wastewater flows.

Policy X – Flow per Capita

Clark Regional Wastewater District
2015 General Sewer Plan – Policy Analysis
Policy X – Flow per capita

Statement

Should the District revise the design and loading standards for the flow contribution from each per capita equivalent or each Equivalent Residential Unit (ERU)?

Current District Policy

Historically, the District has followed design guidelines from the DOE's Orange book – *Criteria for Sewage Works Design*, which has identifies a conservative value of 100 gallons per capita per day (gpcd). This value has been the default value in the absence of better and localized data.

Policy for Consideration

Though system age and local demographics will influence the per capita contribution to the system, it is the District's goal to establish a single standard that will be applied to all existing and future services regardless of location. It is recognized that this average value will underestimate or overestimate actual flow conditions in some cases. But, in total, the application of a single value over the entire service area will balance out any slight disparities stemming from local influences.

Policies of Other Sewering Agencies

Average-day Base Flow with baseline infiltration for the following sewering agencies:

Agency	Gals/day per capita	Person/ERU	Gals/day per ERU
Southwest Suburban Sewer District	60	2.45	147
Alderwood Water Wastewater District	66	2.90	191
City of Puyallup	75	2.43	182
City of Monroe	67.4	2.90	195
City of Lynnwood	70	2.50	175
City of Edmonds	63.5	2.36	150
City of Vancouver (average dry weather)	75	2.70	203
City of Vancouver (estimated average day)	90	2.70	243

Policy Discussion and Analysis

The origin of the 100 gpcd value that is included in DOE's Orange Book has basis that springs from *Recommended Standards for Wastewater Facilities, 1973* (10 States Standards). These figures include an allowance for "nominal and normal infiltration", however additional allowance should be made where conditions are unfavorable.

DOE also recognizes that local flow data and/or water consumption data can be used to establish the flow and loading values in lieu of the 100 gpcd default standard. With the introduction of high efficiency fixtures, modern piping materials and more aggressive I/I control measures, the recent thinking has realized that 100 gpcd is very conservative and has resulted in collection and conveyance systems that were conservatively designed.

Though the previous thinking and design standards have served the District well for many years, it has resulted in systems that have remaining capacity well beyond their originally expected design life.

Actual flow data for the Clark Regional service area over the last 15 to 20 years is summarized on the attachment. This summary suggests that the actual per ERU flow contribution is in line with the values that our sewering agencies have now adopted.

Advantages / Disadvantages

Pro:

1. Captures more realistic flow values
2. Resulting CIP will be reflective of the realistic flows
3. Reduces financial impacts on customers

Con:

1. The previous factor of safety created by the conservative flow values will be eliminated

Impacts

Financial: Reduces future CIP and the effect on the rate structure
Environmental: None
Customer: Reduced monthly sewer charges

Recommendation

Implement an average-day flow contribution of flow per capita not per ERU 200 gals/day per ERU.

Policy XX – Flow Triggers for Pump Stations

Clark Regional Wastewater District
2015 General Sewer Plan – Policy Analysis
Policy XX – Flow Triggers for Pump Stations

Statement
Should the District develop a policy that defines the initiation of planning efforts as Pump Stations approach their rated capacity?

Current District Policy (see Resolution No. __)
No current policy that defines proactive measures to initiate planning and design efforts needed to meet future flow demands.

Policy for Consideration
DOE's Orange book – *Criteria for Sewage Works Design*, stipulates that pump stations are to be designed to meet the peak hour flows with the largest, single pump out-of-service. In a duplex pump station, the two pumps alternate lead operation and the second pump is considered a redundant or backup pump. In a triplex station, the third pump is the redundant pump. The pump(s) remaining in service must be capable of pumping the peak flows entering the station. If the redundant pump is called to run while the other duty pump(s) are running, then that would be in violation of DOE's policy. Therefore, the purpose of this Policy is to identify the trigger(s) that would anticipate and forecast the exceedance of the firm capacity of the station.

Policies of Other Sewering Agencies
Southwest Suburban Sewer District: First time the redundant pump is called to run.

Alderwood Water and Wastewater District: First time the redundant pump is called to run.

City of Puyallup: First time the redundant pump is called to run.

Kitsap County: When influent flows exceed 80% of the pumping capacity.

Soos Creek Utility District: When lead pump runs more than 75% of the time.

Policy Discussion and Analysis

The goal in this policy is to find a trigger that would alert the District that a pump station is approaching a violation of DOE's pump station redundancy guidelines. Other sewering agencies have used 1) number of pump starts, 2) run time of the lead pumps or 3) percentage inflow of firm pump capacity. All these metrics will provide a cautionary alert that the station to approaching that threshold.

Advantages / Disadvantages of each option:

Option 1) *number of pump starts per hour*. Good design practice will aim to limit the number of pump starts per hour to 6 as a preventative target for extended motor life. When a new station is first placed in service and the inflow to the station is presumably low, this number will be very low. The wetwell will slowly fill until the lead pump is called to pump. The held volume will be quickly pumped, followed by another long fill time. As flows increase the fill time will be reduced and the number of pump starts will increase until the inflow to the wetwell reaches 50% of the pump capacity. This condition results in the maximum number of pump starts per hour. As flow continues to increase, the number of pump starts will decrease until such time as the pump is nearly running 100% of the time. When the number of pump starts in trending downward, this would be a cautionary flag that that station should be watched carefully and placed on a watch list for a potential capacity upgrade.

Pro:

- Tracking the number of pump starts per hour provides the District with another metric of good pump operation.

Con:

- Requires District staff to trend pump starts
- Trending should be done over a long enough period to capture true trends, typically at least a couple of years.

Option 2) *run time of lead pump*. As mentioned above the maximum number of pump starts should be approximately 6 starts per hour. The maximum number of pump starts occurs when inflow is 50% of pump capacity. This also correlates to a 50% run time and a 50% rest time, or 30 minutes of run time each hour. As flows increase, the lead pump run time will similarly increase. At some point after the 50%, but before the 100% run time of the lead pump, the District would want to initiate planning measures to increase the pump capacity. A threshold point of 75% of the run time (or 45 minutes per hour) would be consistent with other sewering agencies that are being proactive in their planning measures.

Pro:

- Easily available and trackable data
- Quantifiable threshold point
- Provides a specific point to initiate planning and design
- No trending analysis

Con:

- Requires District staff to track run times
- Periodic draw down tests to check the pumping rates of all pumps

Option 3) *percent of inflow as a percentage of firm pump capacity*. If the District had inflow data available for each station, then comparing that data with the pump station's firm capacity would result in an indicator of when the station's capacity is being approached. Alternatively, the hydraulic model could be used to estimate those peak hour flows to the station. This, however, would require a vigilant effort to keep the model current with new development. The data provided in Option 2, above, is easily available and no more reliable that the flow data described in this option.

Pro:

- Quantifiable threshold point
- Provides a specific point to initiate planning and design
- No trending analysis

Con:

- Requires inflow monitoring which most stations do not have
- No more precise than the data available in Option 2
- Potentially expensive measures need to provide inflow data.
- Routine and regular updating to the hydraulic flow model.

Impacts

Financial: Proactively forecast the need for pump station capacity increases will allow the District to plan for and schedule CIPs

Environmental: Will minimize or eliminate overflows from pump stations.

Customer: Better infrastructural management which will improve the level of service to the customers.

Recommendation: Implement Option 2 and set the threshold point at 75% run time.