SCHEDULE CWR-2

1 EXECUTIVE SUMMARY

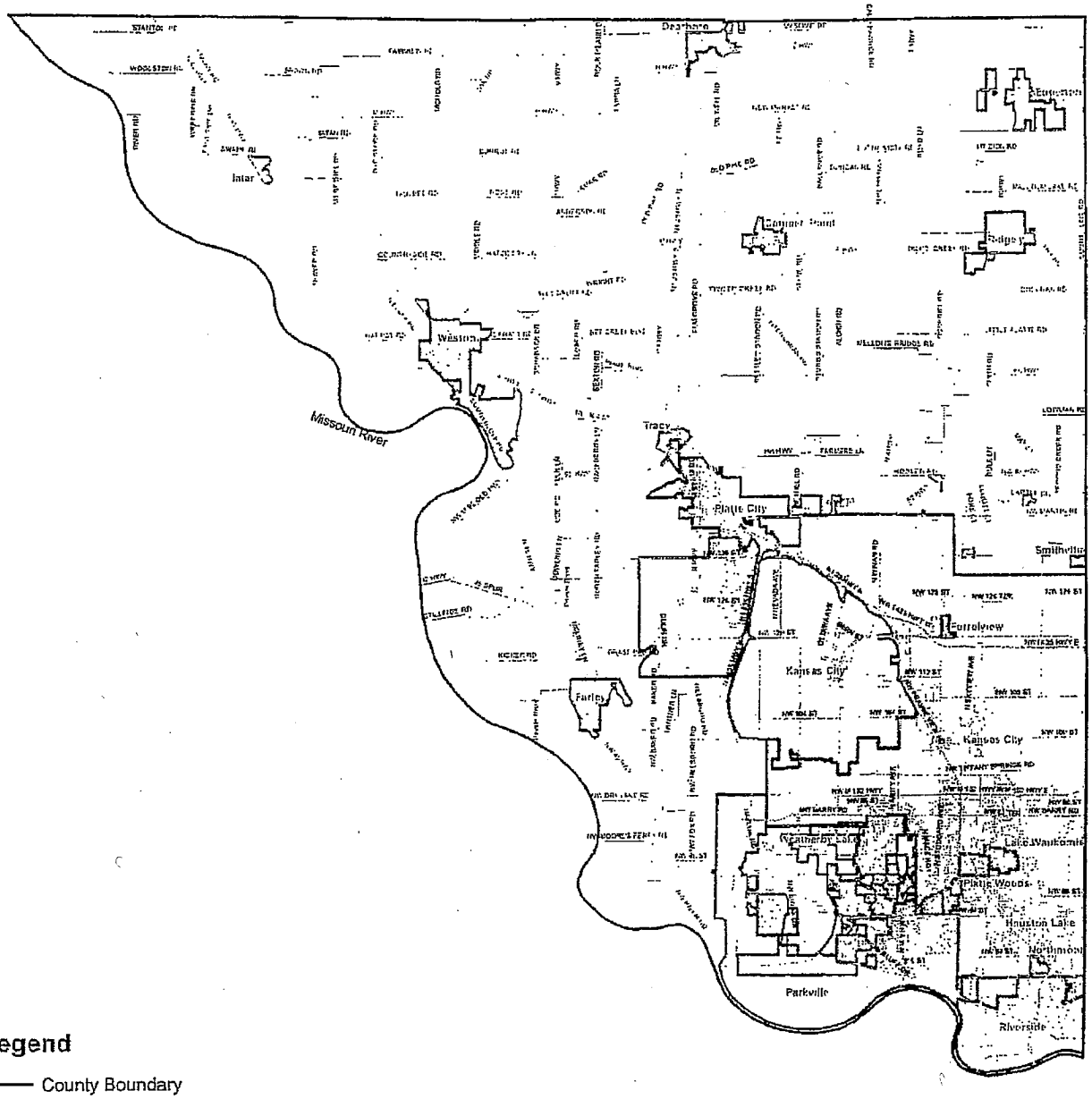
The Platte County Regional Sewer District (PCRSD) completed its first Master Plan in 1995. Beginning in 1996 PCRSD undertook a regionalization project that consolidated a number of independent sewer districts in the Rush Creek Watershed into a centralized collection system served by a regional treatment facility discharging to Brush Creek just upstream of the Missouri River. Since this project was completed, a number of facility additions and sewer extensions have taken place. In 2008, a project to double the capacity of the regional treatment facility was completed.

Recently, significant development activity has taken place in the Brush Creek watershed lying adjacent to and immediately west of the Rush Creek watershed, resulting in construction of an interceptor, pump station, and forcemain system. These facilities will likely "open up" the Brush Creek watershed to further development in the future.

The PCRSD Board of Directors has pledged its commitment to protecting the environment and preserving property values in Platte County. To accomplish this, they have identified the need to work with developers, other sewerage agencies in the County, and other County agencies and departments to proactively plan for the future, with respect to wastewater service. They also recognize that this planning process must anticipate ever increasingly stringent environmental regulations and increasing pressures on sustainable solutions that minimize the consumption of natural resources. It is with all of these objectives in mind that PCRSD has commissioned this 2009 Master Plan Update.

PCRSD's service area consists essentially of all of unincorporated Platte County, as shown in Figure ES-1. Areas shaded in blue are under the jurisdiction of other agencies. It should be noted that some areas lying within city limits, for example, portions of Parkville, fall under PCRSD's jurisdiction with respect to wastewater service. These areas were annexed by the cities subsequent to PCRSD's jurisdiction in these areas being established. The areas shaded on Figure ES-1 in yellow are areas where PCRSD-owned facilities are in place and operational.

The 2009 Master Plan Update was completed through the development of five Technical Memorandums (TM's), each representing a step in the overall planning process. As each TM was completed, workshops were held with PCRSD's Board of Directors and staff to obtain input and guidance. In the following paragraphs, the content, findings, conclusions, and recommendations presented in each TM are summarized.



Legend

- County Boundary
- Road Centerlines
- Timber Creek Sewer Company Area
- City Limits
- PCRSD Service Area as determined in 1992 upon District formation
- Area Outside the PCRSD Service Area

Note: Areas left unshaded constitute PCRSD's Service Area

N

20,000 10,000 0 20,000

Scale - 1:240,000 or 1"=20,000ft

Plot Date: August 4th, 2009

HDR/Archer	Platte County Regional Sewer District 2009 Master Plan Update	Figure ES - 1
	Study Area Map	

TECHNICAL MEMORANDUM NO. 1 - LAND USE, POPULATION, AND WASTEWATER FLOW PROJECTIONS

The purpose of Technical Memorandum No. 1 was to identify and enter into a cooperative planning process with other entities that have stake in the future of wastewater service in Platte County. Specifically, this included the Platte County Planning and Zoning (P&Z) Department, the Cities of Parkville, Platte City, and Kansas City, and several major developers. Meetings were held with each entity, and their input was obtained and incorporated into the process.

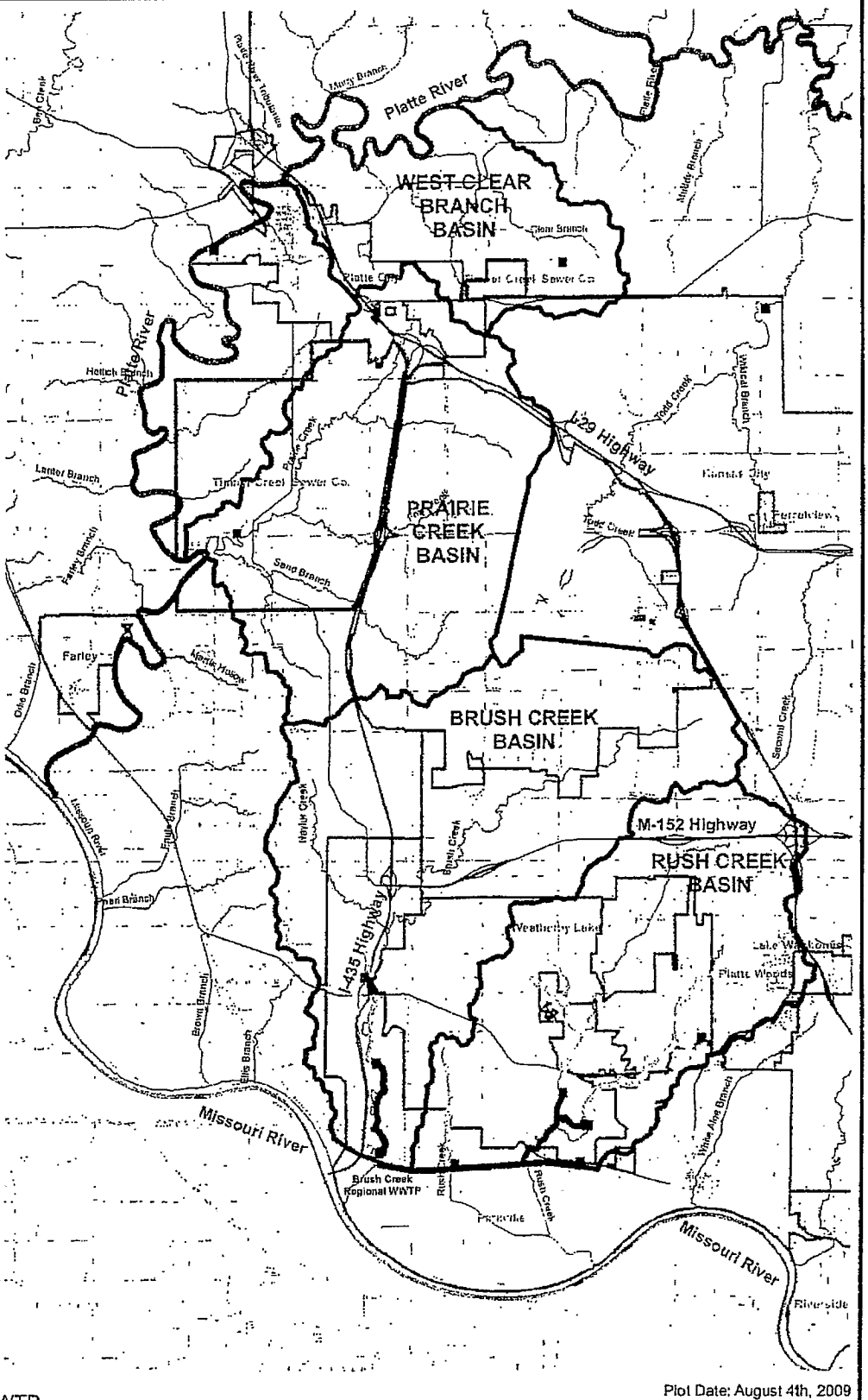
A significant outcome of this process was incorporation into the Master Plan of planning studies recently completed by the County P&Z and the Cities of Parkville and Platte City. An overall land use map was created that clearly indicated that relatively dense "suburban" type development was anticipated in the southern part of the county. This was shown to be primarily in the Rush Creek, Brush Creek, Prairie Creek, and West Clear Branch Watersheds, which are shown in Figure ES-2. PCRSD currently operates sewerage facilities in the Rush Creek and Brush Creek watersheds, with treatment provided by the Brush Creek Regional Wastewater Treatment (WWTP). The planning studies also indicated that development in the northern portion of the county would likely be primarily low density rural in nature.

Population growth rates as reflected in census data were evaluated. Several methodologies for projecting wastewater flow rates were also presented and compared. The ultimate population levels and flowrates, based on the land use types derived from the planning studies, were determined for each of the four watersheds, or "Facility Planning Basins", referenced above. These projections are summarized in Table ES-1:

Table ES-1 Ultimate Population Projections by Basin

Facility Planning Basin	Acres[3]	Future Population at Full Buildout (EDU)[1]	Average Daily Flow (mgd)[2]
Rush Creek[4]	5,792	9,837	3.0
Brush Creek	6,725	14,237	4.3
Prairie Creek	1,543	3,569	1.0
West Clear Branch	4,380	3,013	0.9

[1] EDU = Equivalent Dwelling Units
[2] mgd = million gallons per day
[3] Includes area within PCRSD Service Area only. Does not include other jurisdictions within the watershed.
[4] Currently contains 3193 sewered EDU.



Plot Date: August 4th, 2009

HDR/Archer	Platte County Regional Sewer District 2009 Master Plan Update	Figure ES - 2
	Facility Planning Basins	

TECHNICAL MEMORANDUM NO. 2 - COLLECTION SYSTEM HYDRAULIC MODEL

The purpose of TM No. 2 was to document the development of a hydraulic model for PCRSD's collection system. The model was subsequently used in the evaluation of PCRSD's facilities as part of the master planning process, and will be a valuable tool for evaluating system capacity in the future as the customer base continues to grow.

The model included all major interceptors, pump stations, and forcemains. Collection sewers in areas where no future growth was likely were not included. The software Sewer CAD by Bentley Systems was utilized. In addition to being user friendly and economical, it is easily integrated with PCRSD's ArcView GIS system.

The model was calibrated to existing flowrates, and the results found to correlate closely with actual conditions in the field.

TECHNICAL MEMORANDUM NO. 3 - FACILITY PLANNING AND ALTERNATIVE DEVELOPMENT

The purpose of TM No. 3 was to identify the facility alternatives to meet the future needs of the PCRSD service area.

The regulatory, environmental, and social factors impacting facility planning were discussed. These include:

- Sustainability – the need to find "triple bottom line" solutions that strike a balance between economic, environmental, and social impacts. A number of opportunities for PCRSD were identified, the most important being flow reduction, and hence smaller pipes (lower cost, less consumption of resources) through reduced infiltration and inflow (I/I) originating from both the public and private sector.
- Capacity, Management, Operation and Maintenance (CMOM) – a holistic approach to collection system management.
- Sanitary Sewer Overflow (SSO) regulations – a strong regulatory initiative is underway to reduce/eliminate SSO's. Historically, PCRSD has been fortunate in that it has not experienced wet weather related SSO's.
- Wastewater Treatment Plant Discharge Limits – tighter discharge limits, including nutrient removal, disinfection, and biosolids disposal are being implemented state-wide and should be anticipated by PCRSD upon future expansions or permit renewals.

Each facility planning basin, Rush Creek, Brush Creek, Prairie Creek, and West Clear Branch were evaluated, alternatives were identified, and facilities were sized. It was recommended that PCRSD adopt a less conservative peak flow criteria for use in sizing conveyance facilities than the currently used APWA methodology, recognizing PCRSD's commitment to reducing I\I. The MDNR formula in itself was not believed to be conservative enough, so it was adopted, along with a Factor of Safety of 2.0.

Rush Creek	- a scenario was developed assuming the City of Kansas City (KCMO), which occupies the upper reaches of the wastewater, elects not to participate in future facility improvements (it should be noted that Kansas City did participate in the construction of the existing Pied Creek Interceptor during PCRSD's 1996 regionalization project).
	- two scenarios were developed in which KCMO does participate, one with upgrade of both the Rush Creek and Walnut Creek No. 2 Pump Stations at their existing sites, and one in which they are consolidated to a single location downstream.
	- the majority of PCRSD's existing facilities are in this basin.
Brush Creek	- scenarios were developed both with and without KCMO, which occupies the upper reaches of the watershed.
	- the Brush Creek Interceptor, constructed by the City of Parkville, has recently "opened" this basin to sewer service
Prairie Creek	- this watershed is dominated by the Timber Sewer Company and property owned by KCMO for KCI Airport use.
	- the southern portion of the watershed lying within PCRSD's jurisdiction would be gathered and pumped to the adjacent Brush Creek watershed.
	- the northern portion of the watershed within PCRSD's jurisdiction would be gathered and pumped to the adjacent West Clear Branch watershed.
West Clear Branch	- this basin includes areas within incorporated Platte City (annexed after PCRSD's jurisdiction was established), Timber Creek Sewer Company, and KCMO.
	- two alternatives were identified, one in which flows are pumped to Platte City's existing WWTP and one in which a new WWTP is constructed by PCRSD. Both alternatives include multiple pump stations.
Little Platte	- although not evaluated in this Master Plan, the potential for a regional system comprised of the Wilkerson Creek, Rocky Branch, First Creek, Second Creek, Todd Creek, and Little Platte River drainages, and including areas in Platte County, Clay County, Kansas City, and Smithville, was identified and delineated for future planning purposes.

The topic of decentralized treatment for "cluster areas" outside the major facility planning basins was also discussed in TM No. 3. Considerable discussion took place with County P&Z to develop an approach by PCRSD that did not encourage this type of development, but would provide for quality sewer service should the development actually occur.

TECHNICAL MEMORANDUM NO. 4 - COST ESTIMATES

Cost estimates were developed for each of the facility alternatives and scenarios identified in TM No. 3. The estimates were conceptual in nature, having been derived from prior similar projects and inflated and adjusted as believed appropriate to reflect current conditions in Platte County.

Table ES-2 presents the total cost of each alternative or scenario. These costs include only interceptors, forcemains, and pump stations, and do not include the localized collection sewers. The cost estimates are intended to be all inclusive of construction, engineering, administrative, contingencies, etc.).

Table ES-2 Estimated Cost of Future Interceptor and Pumping Facilities to Accommodate Ultimate Development

Facility Planning Basin		Estimated Cost (2009 Dollars)[1]	
		Total	PCRSD Share
Rush Creek	- without KCMO Flows	$4.96 million	$4.96 million
	- with KCMO Flows and Consolidated Pump Stations	$11.62 million	$5.27 million
	- with KCMO Flows and Separate Pump Stations	$10.64 million	$4.73 million
Brush Creek	- without KCMO Flows	$27.55 million	$27.55 million
	- with KCMO Flows	$44.34 million	$20.23 million
Prairie Creek		$10.00 million	$10.00 million
West Clear Branch	- Treatment by Platte City[2]	$22.36 million	$20.73 million
	- Treatment by PCRSD[2]	$19.01 million	$17.47 million

Notes:
(1) Costs shown are conceptual in nature, are all inclusive (including construction, engineering, legal, administrative, and contingencies, are presented in 2009 dollars, and are intended for master planning purposes only. They do not take into consideration detailed assessment of site specific conditions or constraints. Actual costs may differ significantly from those shown.
(2) Includes treatment cost.

Several future upgrades at the Brush Creek Regional WWTP are likely, both due to capacity needs as well as regulatory requirements. Since the timing of these is not well defined, a "menu" of cost estimates has been developed that can be applied to the various improvements that may be required at any one time, separately or in combination. It is presented in Table ES-3.

Table ES-3 Estimate Cost of Various Upgrade Scenarios Brush Creek Regional WWTP

Upgrade Scenarios	Conceptual Cost ($)[1]
1.0 mgd expansion, same treatment level	$8,100,000
2.0 mgd expansion, same treatment level	$14,900,000
Tertiary Treatment Addition	
• 2.0 mgd	$4,400,000
• 3.0 mgd	$6,000,000
• 4.0 mgd	$7,600,000
Class B Biosolids Addition (Note 1)	
• 2.0 mgd	$5,500,000
• 3.0 mgd	$7,500,000
• 4.0 mgd	$9,500,000

Notes:
(1) Costs shown are conceptual in nature, are all inclusive (including construction, engineering, legal, administrative, and contingencies, are presented in 2009 dollars, and are intended for master planning purposes only. They do not take into consideration detailed assessment of site specific conditions or constraints. Actual costs may differ significantly from those shown.

TECHNICAL MEMORANDUM NO. 5 - ALTERNATIVE ANALYSIS AND FINANCING

In TM No. 5, the alternative solutions for the planning basins were analyzed in terms of life cycle costs and the preferred alternative identified. The Net Present Cost (NPC) was calculated for each alternative taking into account capital cost and operation, maintenance, and replacement (O&M) costs over a 20-year evaluation period:

Rush Creek (with KCMO Flows) – although the estimated capital cost to PCRSD of consolidating the Rush Creek and Walnut Creek No. 2 Pump Stations is $0.5 million higher than keeping them separate, these alternatives are essentially equal from a Net Present Cost standpoint due to savings in O&M cost. Consolidation is also favored from an environmental and social standpoint and is therefore the preferred alternative.

West Clear Branch – the estimated capital cost of "Treatment by Platte City" is 19% higher than "Treatment by PCRSD) and the NPC is 12% higher. This would indicate that "Treatment by PCRSD" is preferable from an economic standpoint. However, the margin is small for a conceptual analysis, and there are a number of non-economic factors, such as the complexity of siting and permitting a new WWTP, that also impact the decision. A more detailed investigation of the appropriate time is warranted prior to making a final decision.

Several financing approaches were discussed, including:

- Debt financing with the debt cost recovered through a fixed rate component of the sewer rate structure.
- Pay-as-you-go financing for small projects and recurring rehabilitation initiatives.
- System Development Charges.
- Developer financed facilities.
- Benefit districts for unsewered areas.

PCRSD currently employs all of these approaches within their system of rates and charges.

SUMMARY AND CONCLUSIONS

PCRSD has been very successful in addressing facility needs and regulatory issues proactively, and has developed a very equitable system of rates and charges to apportion costs to those who benefit from the improvements. PCRSD also has a history of working cooperatively with other entities, both agencies and developers, to find the most advantageous solutions to infrastructure, financing, and procedural challenges.

PCRSD has recently completed major projects in the Rush Creek watershed, the Brush Creek watershed, and at the Brush Creek Regional WWTP, and at this time does not have any immediate capacity or regulatory driven capital project needs. Some opportunities that were identified during this master planning process that PCRSD may want to consider as it moves into the future, are as follows:

- Continue working closely with Platte County and the Cities of Parkville, Platte City, and Kansas City to find the optimum wastewater solutions. The most cost effective solutions for the end users typically follow watershed boundaries, not political boundaries.
- Increase efforts to exclude I/I from the system, including: 1) more rigorous inspection and testing of public mains when they are constructed, 2) increased coordination with codes officials to ensure that building codes are strictly enforced with respect to service line construction and

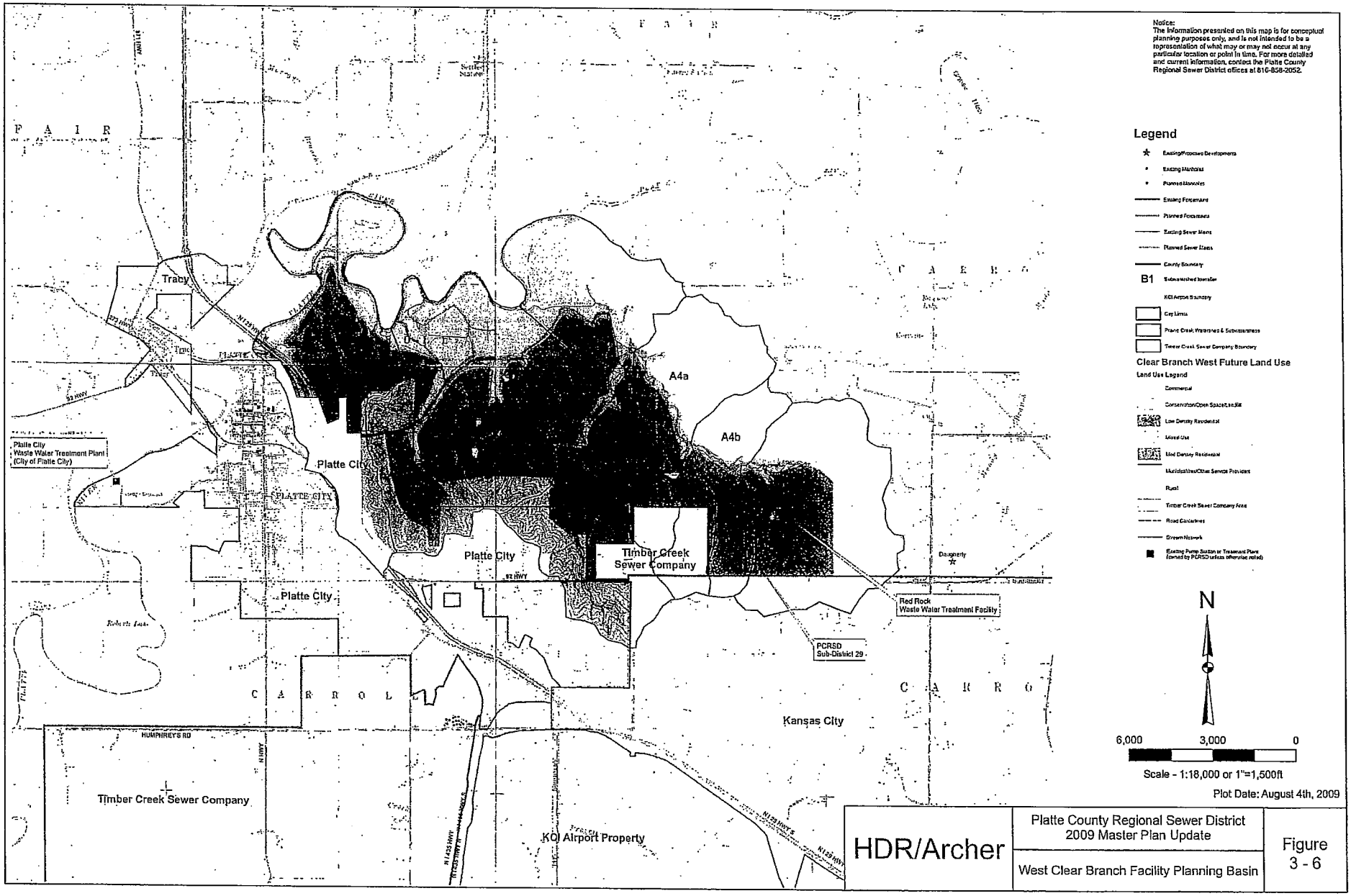
exclusion of illicit connections, and 3) ongoing collection system management and rehabilitation (this item will be discussed separately).

- Adopt the "MDNR Peak Flow Formula with a Factor of Safety of 2.0" for sizing of new facilities, in lieu of the more conservative APWA formula and modify the District's Rules and Regulations accordingly. This should only be done if the efforts to exclude I/I described above are pursued rigorously.
- Continue to enhance collection system management, progressing toward a full CMOM program, which is likely to become a regulatory requirement in the future. Establish an annual budget line item for "collection system inspection and rehabilitation", and begin a condition assessment, prioritization, and rehabilitation program.
- Utilize the maps and tables within this Master Plan to guide the sizing of future interceptors, pump stations and forcemains. Where practical, require facilities to be sized to serve ultimate development of the tributary area. Where ultimate sizing is impractical from an affordability standpoint, develop phasing plans that reflect a planned and orderly progression from initial phase through buildout.
- Begin preparing for more stringent regulatory requirements with respect to wastewater treatment and biosolids disposal. Consider methods of communicating to the customer base how these requirements will ultimately impact the cost of service.
- Establish a developer reimbursement policy for cases where a developer must construct and finance facilities larger than are needed to serve his immediate development, but are required to accommodate future growth in upstream tributary areas.

3.6.4 West Clear Branch Facility Planning Basin

The Clear Branch watershed is actually a series of drainages east of Platte City that are tributary to the Platte River. This area was not identified as a development area in the County Land Use Plan. However, a portion of this area has recently been annexed by the City of Platte City, and the western portion of the Clear Branch watershed has been identified as a development area in the Platte City Land Use Plan. For purposes of this study, the area where development is projected has been designated as the West Clear Branch Facility Planning Basin and is shown in Figure 3-6.

PCRSD's service area in the West Clear Branch Basin includes areas both within and outside of Platte City's boundaries. There are also areas in the upstream portion of the basin that fall within Timber Creek and Kansas City service areas. The land uses from Platte City's Land Use Plan have been shown in Figure 3-6 and have been used to develop population and flow projections in Tables 3-9 and 3-10.


Notice:
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Legend
Existing/Proposed Developments
Existing Manholes
Planned Manholes
Existing Forcemains
Planned Forcemains
Existing Sewer Mains
Planned Sewer Mains
County Boundary
B1 Subwatershed Identifier
KCI Airport Boundary
City Limits
Platte Creek Watersheds & Subwatersheds
Timber Creek Sewer Company Boundary
Clear Branch West Future Land Use
Land Use Legend
Commercial
Conservation/Open Space/Park
Low Density Residential
Mixed-Use
Med Density Residential
Municipalities/Other Service Providers
Rural
Timber Creek Sewer Company Area
Road Centerlines
Stream Network
(Existing Pump Station or Treatment Plant Owned by PCRSD unless otherwise noted)
N
6,000
3,000
0
Scale - 1:18,000 or 1"=1,500ft
Plot Date: August 4th, 2009
Tracy
Platte City
Waste Water Treatment Plant
(City of Platte City)
Platte City
Platte City
Platte City
A4a
A4b
Timber Creek
Sewer Company
Dougherty
Red Rock
Waste Water Treatment Facility
PCRSD
Sub-District 29
Kansas City
Timber Creek Sewer Company
KCI Airport Property
HUMPHREYS RD
FAIR
CARROLL
HDR/Archer
Platte County Regional Sewer District
2009 Master Plan Update
West Clear Branch Facility Planning Basin
Figure
3 - 6

Table 3-9
West Clear Branch Facility Planning Basin
Land Use and Ultimate Population Projections

Sub-Watershed	Area (Acres)													
	Conservation/ Open Space/ Landfill[1]	Low Density Residential[2]	Moderate Density Residential[3]	Mixed Use[4]	Commercial[5]	Industrial[6]	Total	Conservation/ Open Space/ Landfill[1]	Low Density Residential[2]	Moderate Density Residential[3]	Mixed Use[4]	Commercial[5]	Industrial[6]	Total
A1[7]	62	53	0	54	11	84	264	0	53	0	81	25	189	348
A2a	230	84	0	3	0	45	362	0	84	0	5	0	101	190
A2b	48	109	105	167	1	3	433	0	109	315	251	2	7	684
A2c	312	342	0	60	0	3	717	0	342	0	90	0	7	439
A3a[7]	0	164	0	201	6	0	371	0	164	0	302	14	0	479
A3b[7]	464	370	0	0	0	0	834	0	370	0	0	0	0	370
A4a[7]	346	119	0	0	0	0	465	0	119	0	0	0	0	119
A4b[7]	147	141	0	0	0	0	288	0	141	0	0	0	0	141
A4c[7]	402	244	0	0	0	0	646	0	244	0	0	0	0	244
Total	2,011	1,626	105	485	18	135	4,380	0	1,626	315	728	41	304	3,013

Notes:
(1) 0 EDU/acre
(2) 1 EDU/acre
(3) 3 EDU/acre
(4) 1.5 EDU/acre
(5) 2.25 EDU/acre
(6) 2.25 EDU/acre
(7) Subwatershed includes areas outside PCRSD jurisdiction (Platte City, Timber Creek, and Kansas City).

Table 3-10
West Clear Branch Facility Planning Basin
Average Day and Peak Hour Flow Projection
Ultimate Development

Sub-watershed	Area (Acres)	Population (EDU)	Average Daily Flow (gpd)[1]	--- Peak Factor ---		------- Peak Hour Flow (gpd) -------		
				MDNR	MDNR x 2.0	MDNR	MDNR x 2.0	APWA Criteria[2]
A1[3]	264	348	104,325	3.8	7.6	396,400	792,800	1,500,500
A2a	362	190	56,925	3.9	7.8	222,000	444,000	819,000
A2b	433	684	205,050	3.6	7.2	738,200	1,476,400	2,949,300
A2c	717	439	131,625	3.7	7.4	487,000	974,000	1,671,800
A3a[3]	371	479	143,700	3.7	7.4	531,700	1,063,400	2,066,900
A3b[3]	834	370	111,000	3.8	7.6	421,800	843,600	1,357,100
A4a[3]	465	119	35,700	4.0	8.0	142,800	285,600	513,500
A4b[3]	288	141	42,300	4.0	8.0	169,200	338,400	608,400
A4c[3]	646	244	73,200	3.9	7.8	285,500	571,000	1,052,900
Total	4,380	3,013	903,825			3,394,600	6,789,200	12,539,400

(1) Based on total EDU's from Tablel 3-9, times 300 gpd/EDU.
(2) Calculated from the acreages in Table 3-9 multiplied by the corresponding APWA cfs/acre criteria.
(3) Ultimate Flow contributions from upstream portion of watershed (from Platte City, Timber Creek, and/or Kansas City) are as follows (based on APWA criteria for Single Family Residential):

	Area (Acres)	Average Daily Flow (mgd)	MDNR Criteria (mgd)	MDNR x 2.0 Criteria (mgd)	Peak Hour Flow APWA Criteria (mgd)
A1	98	0.09	0.34	0.68	0.80
A3a	108	0.10	--	--	1.40
A3b	55	0.05	--	--	0.71
A4a	107	0.10	--	--	1.38
A4b	21	0.02	--	--	0.27
A4c	123	0.11	--	--	1.59

Table 5-14 Prairie Creek Facility Planning Basin
Conveyance Component Capacity and Sizing for Ultimate Buildout

Component Designation[1]	Required Capacity (MGD)	Required Size (in)	Length (ft)
PS PC1	3.68	N/A	N/A
FM PC1	3.68	16	3200
GS PC1a	3.68	21	1850
GS PC1b	2.76	18	2200
GS PC1c	1.23	12	2350
PS PC2	5.14	N/A	N/A
FM PC2	5.14	20	6900
PS PC3	0.72	N/A	N/A
FM PC3	0.72	8	2400
PS PC4	2.30	N/A	N/A
FM PC4	2.30	12	8800
GS PC4	0.83	10	2650
GS PC5A	1.02	10	1600

Notes:
[1] Refer to Figure 5-3-1 for component locations.

North Subareas – these subareas are "cut off" from the rest of the Prairie Creek basin by the I-29/I-435 Interchange. In addition, they lie adjacent to and in close proximity to the West Clear Branch Basin. It is therefore recommended that they be pumped to West Clear Branch for further conveyance and treatment. This approach is shown on Figure 5-3-1 and the required facility components and sizes are presented in Table 5-14.

5.4.4 West Clear Branch Facility Planning Basin

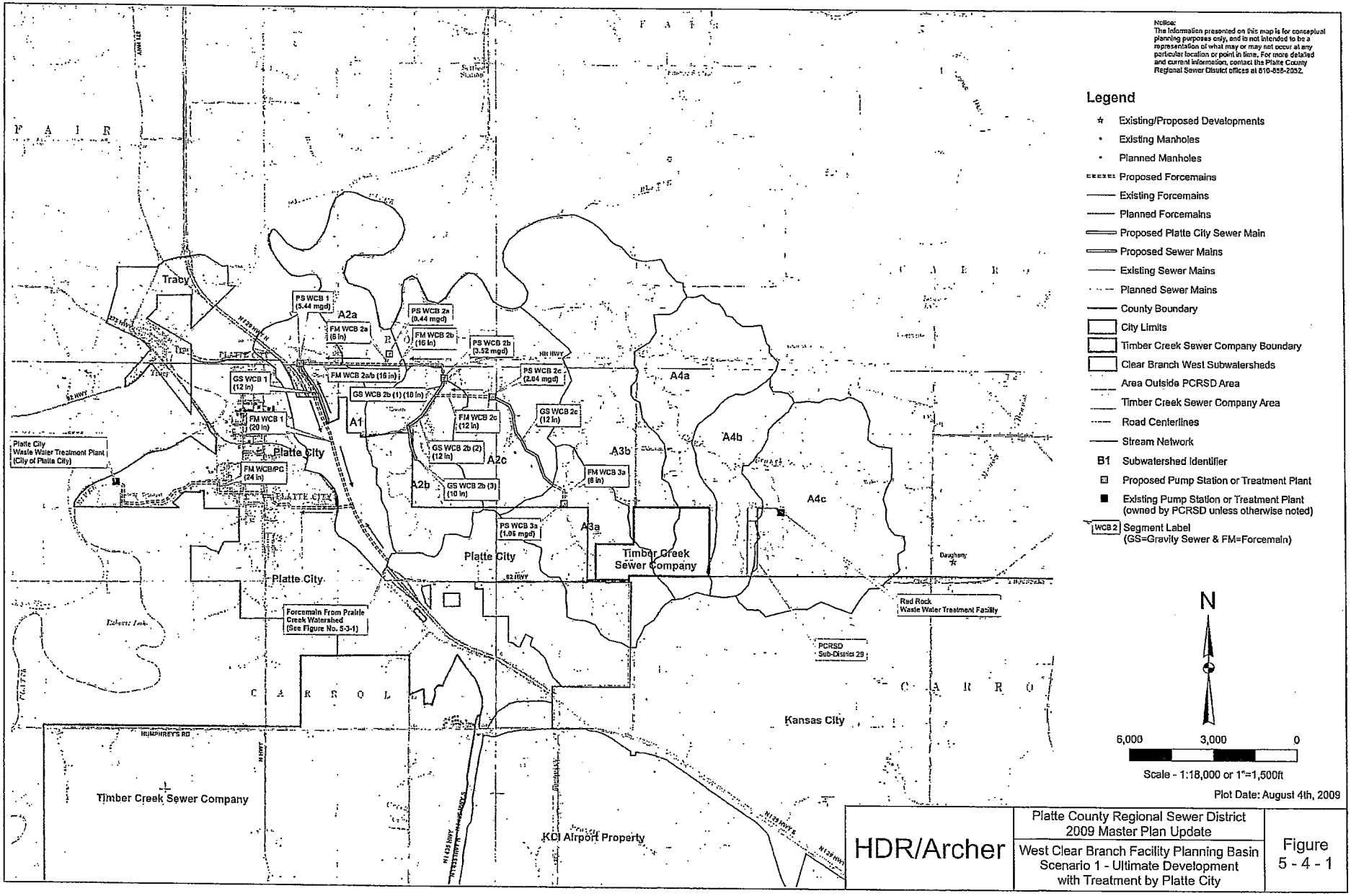
The West Clear Branch Watershed consists of a series of sub-watersheds that drain north to the Platte River. As shown in Figure 5-4-1, a portion of this area lies within the city limits of Platte City. However, this area was annexed by Platte City after PCRSD's jurisdiction was established, therefore sewer service in this area is the responsibility of PCRSD. The planned development in this basin is predominately in the upper reaches of these sub-watersheds. An "all gravity" solution in which gravity interceptors were extended downstream to a common point would involve excessive lengths of gravity sewer through areas of expected low density development and through the Platte River floodplain where the sewer would be inaccessible during flood events. Therefore, the two scenarios considered involve multiple pump stations.

Scenario 1 - Pump Flows to Platte City for Treatment

This scenario is presented in Figure 5-4-1 and Table 5-15. Flows gathered at the various pump stations are conveyed in series to Pump Station WCB1 which then pumps to the Platte City WWTP. The forcemain, initially 20-inch diameter, is joined along the way by the forcemain from the Prairie Creek watershed, and continues from this point to the plant as 24-inch diameter.

Several issues with respect to the Platte City system should be investigated if this alternative is to be considered further. Although the plant has been reported to have some available capacity at this time, the long-term impact on capacity and resulting need for expansion would need to be quantified. Also, the ability of the Platte City collection

system to carry the flows a portion of the way to the plant, thus reducing forcemain length, should be investigated.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Legend
Existing/Proposed Developments
Existing Manholes
Planned Manholes
Proposed Forcemains
Existing Forcemains
Planned Forcemains
Proposed Platte City Sewer Main
Proposed Sewer Mains
Existing Sewer Mains
Planned Sewer Mains
County Boundary
City Limits
Timber Creek Sewer Company Boundary
Clear Branch West Subwatersheds
Area Outside PCRSD Area
Timber Creek Sewer Company Area
Road Centerlines
Stream Network
B1 Subwatershed Identifier
Proposed Pump Station or Treatment Plant
Existing Pump Station or Treatment Plant (owned by PCRSD unless otherwise noted)
WCB 2 Segment Label (GS=Gravity Sewer & FM=Forcemain)
N
6,000
3,000
0
Scale - 1:18,000 or 1"=1,500ft
Plot Date: August 4th, 2009
Traby
PS WCB 1 (5.44 mgd)
A2a
FM WCB 2a (6 in)
PS WCB 2a (0.44 mgd)
FM WCB 2b (16 in)
PS WCB 2b (3.52 mgd)
PS WCB 2c (2.04 mgd)
FM WCB 2a/b (16 in)
GS WCB 1 (12 in)
GS WCB 2b (1) (10 in)
FM WCB 1 (20 in)
A1
FM WCB 2c (12 in)
GS WCB 2c (12 in)
GS WCB 2b (2) (12 in)
A2c
A3b
A4a
A4b
A4c
Platte City Waste Water Treatment Plant (City of Platte City)
Platte City
FM WCB/PC (24 in)
A2b
GS WCB 2b (3) (10 in)
FM WCB 3a (8 in)
PS WCB 3a (1.05 mgd)
A3a
Timber Creek Sewer Company
Daughenty
Red Rock Waste Water Treatment Facility
Forcemain From Prairie Creek Watershed (See Figure No. 5-3-1)
PCRSD Sub-District 29
Kansas City
KCI Airport Property
Timber Creek Sewer Company
HDR/Archer
Platte County Regional Sewer District
2009 Master Plan Update
West Clear Branch Facility Planning Basin
Scenario 1 - Ultimate Development
with Treatment by Platte City
Figure
5 - 4 - 1

Table 5-15 West Clear Branch Facility Planning Basin
Scenario 1 – Ultimate Development with Treatment by Platte City
Conveyance Component Capacity and Sizing

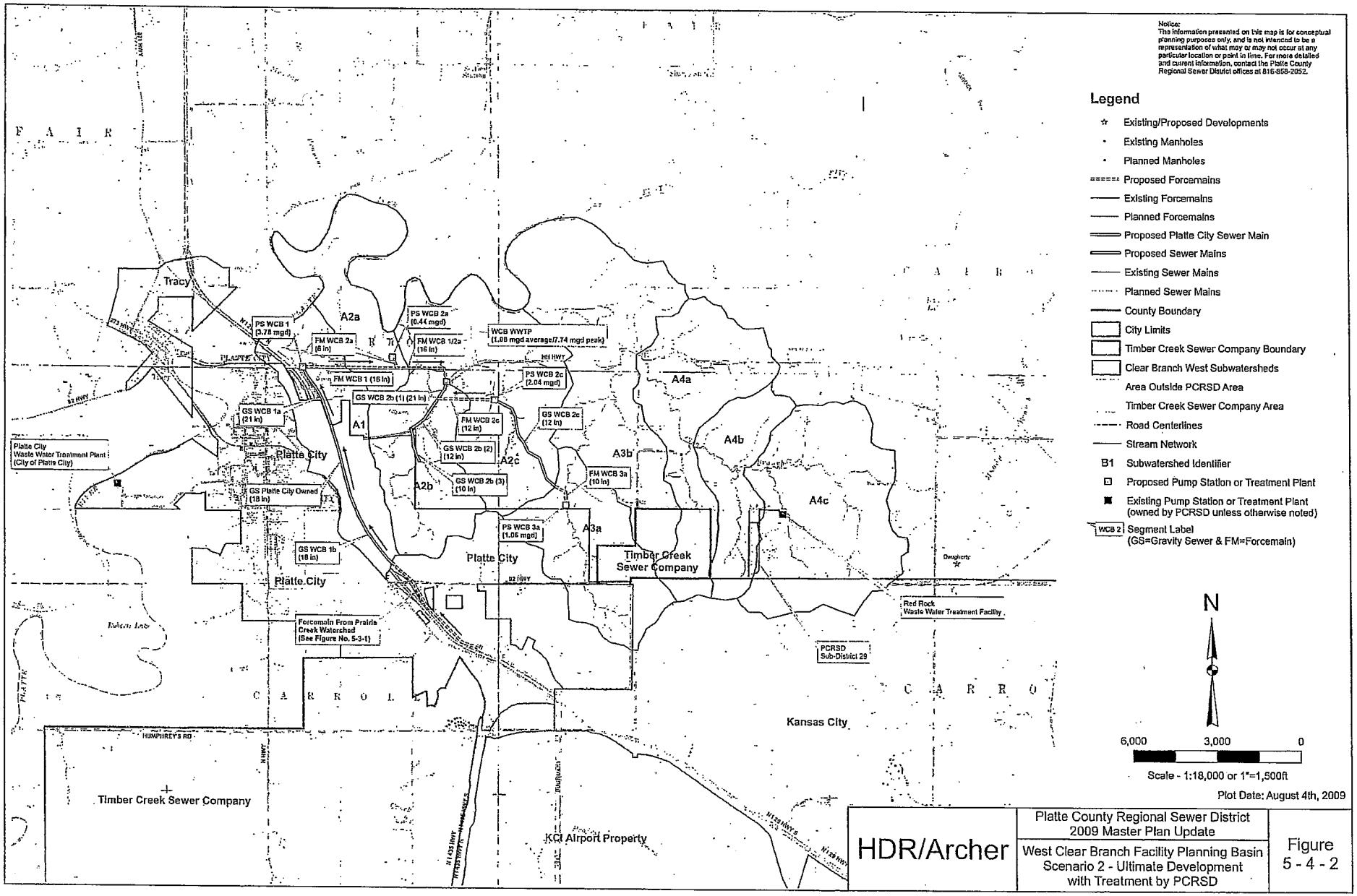
Component Designation[1]	Required Capacity (MGD)	Required Size (in)	Length (ft)
GS WCB1[2]	1.48	12	2300
PS WCB1[2]	5.44	N/A	N/A
FM WCB1[2]	5.44	20	5450
FM WCB/PC[2][3]	7.74	24	10,100
PS WCB2a	0.44	N/A	N/A
FM WCB2a	0.44	6	400
FM WCB2a/b	3.96	16	3100
GS WCB2b(1)	3.52	18	700
GS WCB2b(2)	1.48	12	1500
GS WCB2b(3)	0.74	10	1250
PS WCB2b	3.52	N/A	N/A
FM WCB2b	3.52	16	2500
GS WCB2c	1.38	12	4000
PS WCB2c	2.04	N/A	N/A
FM WCB2c	2.04	12	2050
PS WCB3a	1.06	N/A	N/A
FM WCB3a	1.06	8	900

Notes:
[1] Refer to Figure 5-4-1 for component locations.
[2] Includes 0.68 mgd from Platte City, based on MDNR peak flow criteria.
[3] Includes 2.30 mgd from Prairie Creek Basin.

Scenario 2 - Treatment by PCRSD

This scenario is presented in Figure 5-4-2 and Table 5-16. Flows are gathered and conveyed to a new treatment facility, ultimately just over 1.0 mgd average daily flow, which discharges to the Platte River. As discussed earlier in this TM, a reasonable approach would be to plan for disinfection, and possibly nutrient limits.

As with Scenario 1, pumped flows from the Prairie Creek watershed are included in this alternative. It should be noted that, in Subarea B1, the upper and lower portions of the subarea are in PCRSD service area, and the area in between is in Platte City's service area. Therefore, an arrangement will need to be worked out to accommodate the exchange of flows from PCRSD to Platte City to PCRSD (this arrangement exists in Scenario 1 also).



HDR/Archer

Platte County Regional Sewer District
2009 Master Plan Update

West Clear Branch Facility Planning Basin
Scenario 2 - Ultimate Development
with Treatment by PCRSD

Figure
5 - 4 - 2

Table 5-16 West Clear Branch Facility Planning Basin
Scenario 2 – Ultimate Development with Treatment by PCRSD
Conveyance Component Capacity and Sizing

Component Designation[1]	Required Capacity (MGD)	Required Size (in)	Length (ft)
GS WCB1a[2][3]	3.78	21	2350
GS WCB1b[2][3]	2.70	18	2400
PS WCB1[2][3]	3.78	N/A	N/A
FM WCB1[1][2]	3.78	16	3400
PS WCB2a	0.44	N/A	N/A
FM WCB2a	0.44	6	400
FM WCB1/2a[2][3]	4.22	16	2200
GS WCB2b(1)	3.52	21	700
GS WCB2b(2)	1.48	12	1500
GS WCB2B(3)	0.74	10	1250
WWTP[2][3][4]	7.74	N/A	N/A
GS WCB2c	1.38	12	4000
PS WCB2c	2.04	N/A	N/A
FM WCB2c	2.04	12	2050
PS WCB3a	1.06	N/A	N/A
FM WCB3a	1.06	10	900

Notes:
[1] Refer to Figure 5-4-2 for component locations.
[2] Includes 2.30 mgd from Prairie Creek Basin.
[3] Includes 0.68 mgd from Platte City, based on MDNR peak flow criteria.
[4] For the WWTP, 7.74 mgd is the peak hour flow. The average daily flow is 1.06 mgd.

5.4.5 Little Platte Facility Planning Basin

As discussed in TM No. 1, the potential exists for a multi-city, multi-county regional system comprising several sub-basins that drain north to the Little Platte River. A conceptual representation of the main trunk interceptors and WWTP is presented in Figure 5-5-1. As this is not likely to occur within the foreseeable future, and will largely be driven by KCMO, no attempt to project flows and component sizes has been made at this time.

6.3.4 Prairie Creek Facility Planning Basin

Table 6-9 presents the cost estimate for the Prairie Creek Basin.

Table 6-9 - Conceptual Cost Estimate
Prairie Creek Facility Planning Basin

Segment Designation	Quantity (LF)	Diameter Size (in)	Unit Cost ($/LF)	Cost ($)
PS PC1 (3.68 mgd, MH)	LS	--	--	$1,700,000
FM PC1	3200	16	$120	$384,000
GS PC1a	1850	21	$189	$349,650
GS PC1b	2200	18	$162	$356,400
GS PC1c	2350	12	$108	$253,800
PS PC2 (5.14 mgd, HH)	LS	--	--	$2,600,000
FM PC2	6900	20	$150	$1,035,000
PS PC3 (0.72 mgd, MH)	LS	--	--	$500,000
FM PC3	2400	8	$60	$144,000
PS PC4 (2.30 mgd, HH)	LS	--	--	$1,500,000
FM PC4	8800	12	$90	$792,000
GS PC4	2650	10	$90	$238,500
GS PC5A	1600	10	$90	$144,000
Total				$9,997,350

Notes:
1. LH = low head, MH = medium head, HH = high head; LS = lump sum
2. Costs shown are conceptual in nature, are all inclusive (including construction, engineering, legal, administrative, and contingencies), are presented in 2009 dollars, and are intended for master planning purposes only. They do not take into consideration detailed assessment of site specific conditions or constraints. Actual costs may differ significantly from those shown.
3. Reference Figure 5-3-1 and Table 5-14 for segment description, location, and sizing information.

6.4 West Clear Branch Facility Planning Basin

Cost estimates for the two alternatives developed for the West Clear Branch Basin (treatment by Platte City and treatment by PCRSD) are presented in Tables 6-10 and 6-11.

The economic comparison of these two alternatives, including consideration of operation and maintenance cost and third party treatment, is presented in TM No. 5.

Table 6-10 - Conceptual Cost Estimate
West Clear Branch Facility Planning Basin
Treatment by Platte City

Segment Designation	Quantity (LF)	Diameter Size (in)	Unit Cost ($/LF)	Cost ($)
GS WCB1	2300	12	$108	$248,400
PS WCB1 (5.44 mgd, HH)	LS	--	--	$2,700,000
FM WCB1	5450	20	$150	$817,500
FM WCB/PC	10,100	24	$180	$1,818,000
PS WCB2a (0.44 mgd, MH)	LS	--	--	$400,000
FM WCB2a	400	6	$45	$18,000
FM WCB2a/b	3100	16	$120	$372,000
GS WCB2b(1)	700	18	$162	$113,400
GS WCB2b(2)	1500	12	$108	$162,000
GS WCB2b(3)	1250	10	$90	$112,500
PS WCB2b (3.52 mgd, MH)	LS	--	--	$1,600,000
FM WCB2b	2500	16	$120	$300,000
GS WCB2c	4000	12	$108	$432,000
PS WCB2c (2.04 mgd, MH)	LS	--	--	$1,100,000
FM WCB2c	2050	12	$90	$184,500
PS WCB3a (1.06 mgd, LH)	LS	--	--	$500,000
FM WCB3a	900	8	$60	$54,000
Total, Conveyance				$10,932,300
Allowance for Platte City Treatment (See Note 4)				$11,430,000
Total with Treatment Alalowance				$22,362,300

Notes:
1. LH = low head, MH = medium head, HH = high head; LS = lump sum
2. Costs shown are conceptual in nature, are all inclusive (including construction, engineering, legal, administrative, and contingencies), are presented in 2009 dollars, and are intended for master planning purposes only. They do not take into consideration detailed assessment of site specific conditions or constraints. Actual costs may differ significantly from those shown.
3. Reference Figure 5-4-1 and Table 5-15 for segment description, location, and sizing information.
4. The capital cost equivalent of treatment capacity at Platte City is assumed to be 90% of the cost of equivalent capacity at a smaller PCRSD-owned facility recognizing the economies of scale (PCRSD WWTP cost = $12,700,000 (from Table 6-11), Platte City WWTP cost allowance = 0.90 x 12,700,000 = $11,430,000).

Table 6-11 - Conceptual Cost Estimate
West Clear Branch Facility Planning Basin
Treatment by PCRSD

Segment Designation	Quantity (LF)	Diameter Size (in)	Unit Cost ($/LF)	Cost ($)
GS WCB1a	2350	21	$189	$444,150
GS WCB1b	2400	18	$162	$388,800
PS WCB1 (3.78 mgd, MH)	LS	--	--	$1,700,000
FM WCB1	3400	16	$120	$408,000
PS WCB2a (0.44 mgd, MH)	LS	--	--	$400,000
FM WCB2a	400	6	$45	$18,000
FM WCB1/2a	2200	16	$120	$264,000
GS WCB2b(1)	700	21	$189	$132,300
GS WCB2b(2)	1500	12	$108	$162,000
GS WCB2B(3)	1250	10	$90	$112,500
WWTP (1.06 mgd)	LS	--	--	$12,700,000
GS WCB2c	4000	12	$108	$432,000
PS WCB2c (2.04 mgd, MH)	LS	--	--	$1,100,000
FM WCB2c	2050	12	$90	$184,500
PS WCB3a (1.06 mgd, LH)	LS	--	--	$500,000
FM WCB3a	900	10	$75	$67,500
Total				$19,013,750

Notes:
1. LH = low head, MH = medium head, HH = high head; LS = lump sum
2. Costs shown are conceptual in nature, are all inclusive (including construction, engineering, legal, administrative, and contingencies), are presented in 2009 dollars, and are intended for master planning purposes only. They do not take into consideration detailed assessment of site specific conditions or constraints. Actual costs may differ significantly from those shown.
3. Reference Figure 5-4-2 and Table 5-16 for segment description, location, and sizing information.

6.5 CONCLUSIONS AND RECOMMENDATIONS

The conceptual cost estimating approach presented in TM No. 4 was reviewed with the PCRSD Board of Directors and it was concluded that the approach was conservative, but was reasonable and appropriate. It was understood that actual costs may differ significantly from the conceptual estimates based on site specific conditions existing at such time as the improvements are constructed. It was also understood that costs presented were for facilities sized to accommodate ultimate buildout, and that in many cases these facilities will be constructed in phases of appropriately sized increments that will be determined based on need and affordability at such time as the facilities are to be constructed. Costs presented are in 2009 dollars and should be adjusted to the actual year in which they occur to account for inflation.

7.7 WEST CLEAR BRANCH FACILITY PLANNING BASIN

Tables 7-8 and 7-9 present cost per EDU calculations for PCRSD customers for the two scenarios for the West Clear Branch Basin. The average cost per EDU for the "Treatment by Platte City" scenario is $6578/EDU [($10,218,762 + 10,515.600) ÷ 3152] versus $5543/EDU ($17,471,470 ÷ 3152 EDU) for the "Treatment by PCRSD" scenario (note that the 3152 EDU includes 1,012 EDU pumped from the Prairie Creek watershed). The "Treatment by Platte City" scenario includes a representative treatment cost allowance which has been added in to provide for an apples-to-apples comparison. In lieu of performing a detailed evaluation of the Platte City WWTP, and its cost of treatment/expansion, a reasonable assumption for this cost would be on the order of 90% of the "Treatment by PCRSD" cost of treatment, recognizing the economies of scale of consolidated treatment at a larger facility and the likelihood that they would be subject to the same permit requirements. The above figures indicate that their treatment by PCRSD's scenario is less costly by about 19%, which appears logical in that the same amount of treatment capacity is provided (although not as economically as at a larger facility), but the cost of a higher head pump station and a long forcemain are avoided. However, prior to drawing a conclusion based on capital cost alone, a Net Present Cost (NPC) analysis taking into account annual operation, maintenance, and replacement costs, is warranted.

The NPC analysis will incorporate the following assumptions:

- As described above, the capital cost equivalent of treatment capacity at Platte City is assumed to be 90% of the cost of equivalent capacity at a smaller PCRSD-owned facility (PCRSD WWTP cost = $11,684,000 (from Table 7-9), Platte City WWTP cost = 0.90 x 11,684,000 = $10,515,600).
- The PCRSD annual cost of treatment will be $145/EDU/year (per TM No. 4, Section 6.3), or $145 x 3152 EDU's = $457,040/year. Platte City cost of treatment will be taken as 90% of this, or $411,340/year, recognizing that the same economies of scale would also apply to O&M.
- Higher head pumping is required in the "Treatment by Platte City" alternative. This results in a higher pump station capital cost, $6,300,000 versus $4,970,000 for the "Treatment by PCRSD" alternative. The higher head pump station would have higher annual O&M costs, estimated at 2% of the capital cost difference of $1,330,000, or $26,600/year. In addition, the incremental electrical power cost resulting from pumping 3152 EDU, or 945,600 gallons per day against an additional 50 feet (or more) of head is calculated to be approximately $7,000/year.

Treatment by Platte City

Capital Cost	=	Conveyance + Treatment
	=	$10,218,762 + 10,515,600
	=	$20,734,362
Annual Cost	=	Treatment + Incremental Pumping Cost (Maintenance and Electricity)
	=	$411,540 + 26,600 + 7,000
	=	$444,940
NPC	=	Capital Cost + P/A (Annual Cost)
	=	$20,734,362 + 16.35 (444,940)
	=	$28,009,131

Note: See Section 7.2 for derivation of P/A time value of money factor.

Table 7-8
Cost Allocation
West Clear Branch Regional Planning Basin
Treatment by Platte City

Segment Designation	Total Cost ($)	Total Peak Flow (MGD)	Allocated Peak Flow (MGD)		% of Total Cost (based on Peak Flow)		Cost Share ($)		PCRSD EDU	PCRSD Cost/EDU ($)
			PCRSD	Platte City	PCRSD	Platte City	PCRSD	Platte City		
GS WCB1	$248,400	1.48	0.8	0.68	54%	46%	$134,270	$114,130	348	$386
PS WCB1 (5.44 mgd, HH)	$2,700,000	5.44	4.76	0.68	88%	13%	$2,362,500	$337,500	2140	$1,104
FM WCB1	$817,500	5.44	4.76	0.68	88%	13%	$715,313	$102,188	2140	$334
FM WCB/PC (Note 4)	$1,818,000	7.74	7.06	0.68	91%	9%	$1,658,279	$159,721	3152	$526
PS WCB2a (0.44 mgd, MH)	$400,000	0.44	0.44	0	100%	0%	$400,000	$0	190	$2,105
FM WCB2a	$18,000	0.44	0.44	0	100%	0%	$18,000	$0	190	$95
FM WCB2a/b	$372,000	3.96	3.96	0	100%	0%	$372,000	$0	1792	$208
GS WCB2b(1)	$113,400	3.52	3.52	0	100%	0%	$113,400	$0	1602	$71
GS WCB2b(2)	$162,000	1.48	1.48	0	100%	0%	$162,000	$0	684	$237
GS WCB2b(3)	$112,500	0.74	0.74	0	100%	0%	$112,500	$0	342	$329
PS WCB2b (3.52 mgd, MH)	$1,600,000	3.52	3.52	0	100%	0%	$1,600,000	$0	1602	$999
FM WCB2b	$300,000	3.52	3.52	0	100%	0%	$300,000	$0	1602	$187
GS WCB2c	$432,000	1.38	1.38	0	100%	0%	$432,000	$0	918	$471
PS WCB2c (2.04 mgd, MH)	$1,100,000	2.04	2.04	0	100%	0%	$1,100,000	$0	918	$1,198
FM WCB2c	$184,500	2.04	2.04	0	100%	0%	$184,500	$0	918	$201
PS WCB3a (1.06 mgd, LH)	$500,000	1.06	1.06	0	100%	0%	$500,000	$0	479	$1,044
FM WCB3a	$54,000	1.06	1.06	0	100%	0%	$54,000	$0	479	$113
	$10,932,300						$10,218,762	$713,538		
Treatment Allowance	$11,430,000	1.06[3]	0.97[3]	0.09[3]	92%	8%	$10,515,600	$914,400	3152	$3,336

Note:

1. Costs shown are conceptual in nature, are all inclusive (including construction, engineering, legal, administrative, and contingencies), are presented in 2009 dollars, and are intended for master planning purposes only. They do not take into consideration detailed assessment of site specific conditions or constraints. Actual costs may differ significantly from those shown.
2. Reference Figure 5-4-1, Table 5-15 for segment description, location, and sizing information.
3. WWTP is apportioned based on average daily flows, not peak flow.
4. Forcemain WCG/PC is located within the Platte City limits west of I-29 (including the I-29 crossing). It continues to the existing Platte City WWTP assuming the worst case scenario that there is no available capacity within Platte City's existing conveyance system.

Table 7-9
Cost Allocation
West Clear Branch Facility Planning Basin
Treatment by PCRSD

Segment Designation	Total Cost ($)	Total Peak Flow (MGD)	Allocated Peak Flow (MGD)		% of Total Cost (based on Peak Flow)		Cost Share ($)		PCRSD EDU	PCRSD Cost/EDU ($)
			PCRSD	Platte City	PCRSD	Platte City	PCRSD	Platte City		
GS WCB1a	$444,150	3.78	3.1	0.68	82%	18%	$364,250	$79,900	1360	$268
GS WCB1b	$388,800	2.7	2.02	0.68	75%	25%	$290,880	$97,920	1012	$287
PS WCB1 (3.78 mgd, MH)	$1,700,000	3.78	3.1	0.68	82%	18%	$1,394,180	$305,820	1360	$1,025
FM WCB1	$408,000	3.78	3.78	0	100%	0%	$408,000	$0	1360	$300
PS WCB2a (0.44 mgd, MH)	$400,000	0.44	0.44	0	100%	0%	$400,000	$0	190	$2,105
FM WCB2a	$18,000	0.44	0.44	0	100%	0%	$18,000	$0	190	$95
FM WCB1/2a	$264,000	4.22	3.54	0.68	84%	16%	$221,460	$42,540	1550	$143
GS WCB2b(1)	$132,300	3.52	3.52	0	100%	0%	$132,300	$0	1602	$83
GS WCB2b(2)	$162,000	1.48	1.48	0	100%	0%	$162,000	$0	684	$237
GS WCB2B(3)	$112,500	0.74	0.74	0	100%	0%	$112,500	$0	342	$329
WWTP (1.06 mgd)	$12,700,000	1.06 [3]	0.97 [3]	0.09 [3]	92%	8%	$11,684,000	$1,016,000	3152	$3,707
GS WCB2c	$432,000	1.38	1.38	0	100%	0%	$432,000	$0	918	$471
PS WCB2c (2.04 mgd, MH)	$1,100,000	2.04	2.04	0	100%	0%	$1,100,000	$0	918	$1,198
FM WCB2c	$184,500	2.04	2.04	0	100%	0%	$184,500	$0	918	$201
PS WCB3a (1.06 mgd, LH)	$500,000	0.16	0.16	0	100%	0%	$500,000	$0	479	$1,044
FM WCB3a	$67,500	1.06	1.06	0	100%	0%	$67,500	$0	479	$141
	$19,013,750						$17,471,570	$1,542,180		

Note:

1. Costs shown are conceptual in nature, are all inclusive (including construction, engineering, legal, administrative, and contingencies), are presented in 2009 dollars, and are intended for master planning purposes only. They do not take into consideration detailed assessment of site specific conditions or constraints. Actual costs may differ significantly from those shown.
2. Reference Figure 5-4-2 and Table 5-16 for segment description, location, and sizing information.
3. WWTP is apportioned based on average daily flows, not peak flow.

Treatment by PCRSD

Capital Cost	=	$17,471,570
Annual Cost	=	Treatment
	=	$457,040
NPC	=	Capital Cost + P/A (Annual Cost)
	=	$17,471,570 + 16.35 (457,040)
	=	$24,944,174

The "Treatment by PCRSD" alternative has the lower NPC, making it appear preferable from a life cycle cost standpoint. However, the "Treatment by Platte City" alternative's NPC is only about 12% higher and recognizing the nature of, and level of precision in, conceptual cost estimating, this is a relatively small margin. It is recommended that a more detailed evaluation, including evaluation of the cost of treatment and expansion (if required) of the Platte City WWTP, be conducted prior to adopting this conclusion.

Other, non-economic, factors will most likely weigh heavily in the ultimate decision of which alternative to pursue, including:

- Regulatory acceptance of another discharge point.
- Public acceptance of another WWTP facility.
- Platte City's willingness to enter into a cooperative arrangement with PCRSD.
- The timing and location of development within the basin and how it impacts the manner in which facilities are phased in.

Clearly, a more detailed analysis is warranted that takes into account economic and non-economic factors that exist at that point in time at which the project is to be undertaken.

7.8 FINANCING ALTERNATIVES AND APPROACHES

PCRSD's authority to issue debt and generate the necessary revenues to cover its cost of doing business through a system of rates and charges is provided for in RsMO Section 204. PCRSD has devoted considerable effort over the past several years in developing an approach to financing of capital improvements which satisfactorily meets cost recovery needs while equitably distributing the costs between those parties benefitting from the improvements, i.e. the existing rate payers and developers. A brief discussion of each of PCRSD's cost recovery mechanisms follows:

Sewer Rate Capital Recovery Component – Improvements benefitting the existing rate payers, i.e. regulatory driven improvements, consolidation/replacement of obsolete/inefficient facilities (such as the 1996 regionalization project), etc., are financed through debt, and the principal and interest on the debt are recovered through a fixed rate component in the sewer rate structure (O&M&R are recovered through a variable rate component based on winter quarter water consumption).

PCRSD has traditionally issued debt through the Missouri State Revolving Fund (SRF) Loan Program which offers a 70% interest subsidy to qualifying projects. This approach has been very successful in the past and should be continued.

Sewer Rate Financed Pay-as-You-Go Project – PCRSD finances the capital costs of some small projects directly from funds generated from sewer rates. This is a suitable mechanism for small, short duration projects in lieu of debt financing. This is also a common method employed by many agencies to specifically budget for and fund collection system rehabilitation projects over a multi-year program.