Bee Branch Restoration Alignment Study

Bee Branch Citizen Advisory Committee (BBCAC)

Meeting # 4 – March 11, 2004

CDM listen. think. deliver.℠

WHKS & CO.

Meeting Agenda

- Introduction / Meeting Objectives
- Finalize Alternative Evaluation Criteria
- Alignments
- Alternative Development
- Alternative Evaluation
- Alignment/Alternative modifications/optimization by BBCAC
- Alternatives for Next Meeting

Introduction / Primary Objectives

- Identify any outstanding items from Meeting #3
- Finalize Evaluation Criteria
- Review CDM modifications to alignments
- Review two alternatives developed from the alignments
- Select an alignment/alternative to develop further and evaluate for the next meeting

Finalize Alternative Evaluation Criteria
(Performance criteria: scales & measures)

- Review the changes made to Alternative Evaluation Criteria per discussion from Meeting #3
- Reach agreement on these criteria in order to apply them to evaluate our alternatives

Evaluation Criteria, Performance Measures, Scales and Weights
BBCAC Meeting 4 March 11, 2004

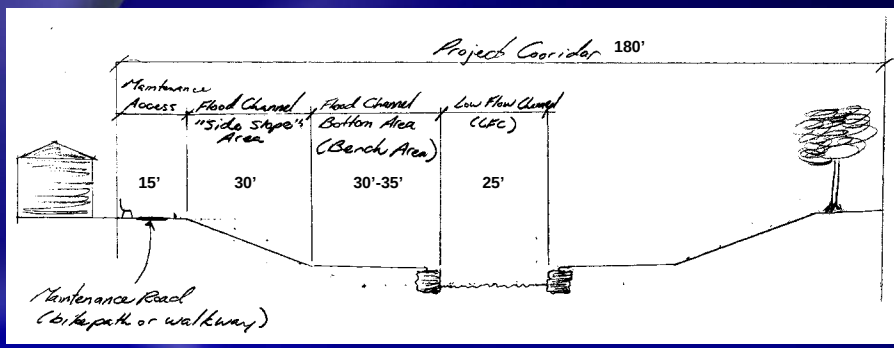
Rank	Objective(Evaluation Criteria)	Performance Measure	Scale	Weight
1	Preserve commercial/ noncommercial services	Number of commercial/non commercial services lost through business relocation	Assume that order of magnitude number of services potentially lost are 10. Use number of services lost as points (may need to adjust after number of potential lost services are identified). 10 or more services lost would still be 10 points. *Once the alignments were selected – all the alignments but one affected more than 10 commercial properties. Thus the points were prorated, with the worst alignment affecting 16 commerical properties (10 points) and lesser totals such as 9 commercial properties receiving 5.6 points [(9/16)*10].*	2.4
2	Minimize residential property acquisitions	Number of properties that must be acquired	Prorate the number of residential property acquisitions to alignment with highest number. Thus if the worst alignment takes 64 residences (10 points), then an alignment affecting 60 residences would receive a point total of (60/64)*10 = 9.4.	2.1
3	Minimize cost	Estimated project cost	Establish ranges based on how close to City's budget of $17M. $17M or less=0; 0-10% more than $17M ($18.7M) = 1; 11-20% more than $17M ($20.4M) = 2; 41-50% ($25.5M) = 5; 91-100% ($34M) = 10. *Once costs were finalized, the pipe alignment was greater than 100% ($34M), so points were pro-rated to the higher cost estimate ($24M).*	1.8
4	Preserve neighborhood access / connectivity	Number of streets that are obstructed by the project	Count the total number of streets that are cut off or lost and use that number; which means that obstructing 10 or more streets gets same score	1.4
5	Minimize health and safety risk	Number of safety issues identified	Characterize health and safety impacts through several individual criteria: pest potential (rodents/bugs/viruses) =2 pts, attractive nuisance (will it attract children) =2 pts, danger (deep water, high velocity, steep drops)=6 pts.	1.4
6	Enhance quality of life	Relative score of whether alternative adds value or lowers value of the neighborhood	Scale of 0 to 10; with 0 being good and 10 being bad. This will be a qualitative and somewhat arbitrary judgment based on the relative quality of life enhancement between alternatives	1.3
7	Protect environment	Good or bad impacts to a number of environmental parameters	Characterize environmental impacts through 10 individual criteria: air, water, soil, groundwater, flora, fauna, noise, historical/cultural, social, environmental justice. Each criterion is assessed as a 1 or 0. 0 if no significant adverse impacts. 1 if significant impacts are perceived. An enhancement could be given a -1. Impacts to endangered species will not be scored but will "kill" the project, unless acceptable mitigation is possible.	1.0

Weights are based voting exercise at the Dec 2003 BBCAC meeting and scales are based on discussion at Jan 2004 BBCAC meeting.

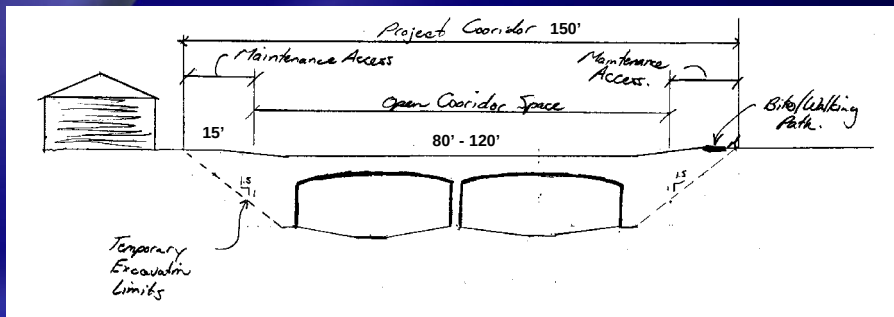
Alignments

- **BBCAC Alignments from Meeting 3**
  - Alignments 1, 2, 3 chosen by subgroups of BBCAC
  - Alignments 4 and 5 (hybrids of BBCAC alignments)
- **CDM Modifications to BBCAC Alignments**
  - Minor changes made to alignments to:
    - simplify road crossings and connections to existing Bee Branch pipe
    - avoid pertinent businesses/utilities
    - maintain integrity of Packing Plant site
- **Alignment Evaluations**
  - 180-foot Open Channel Corridor utilized to compare alignments

Typical Cross Section
Open Channel

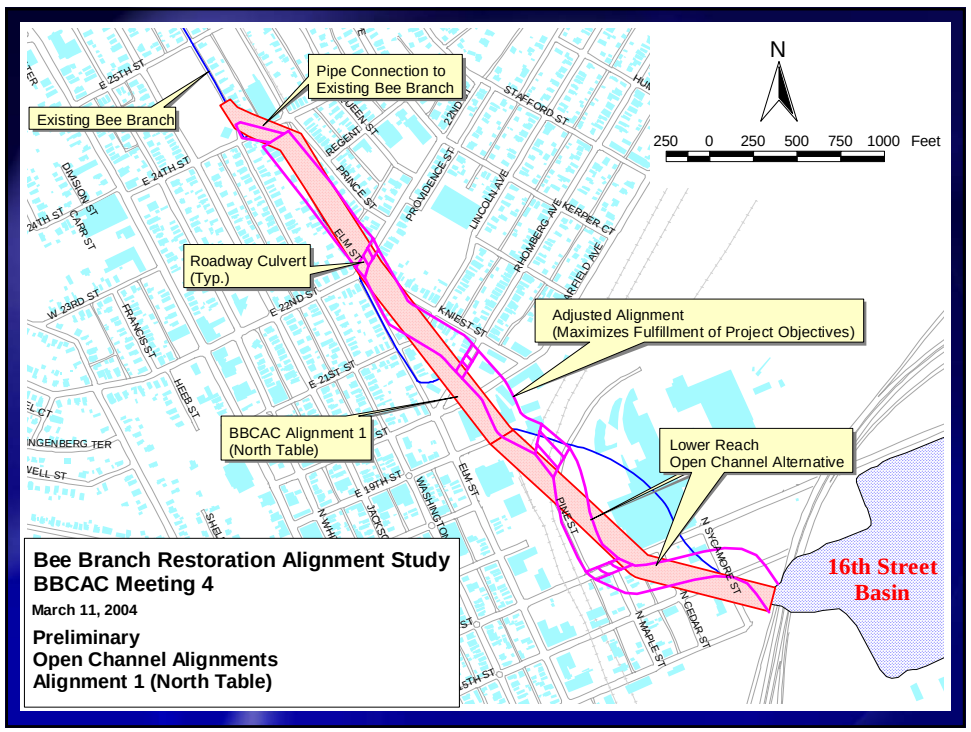


Typical Cross Section
Pipe



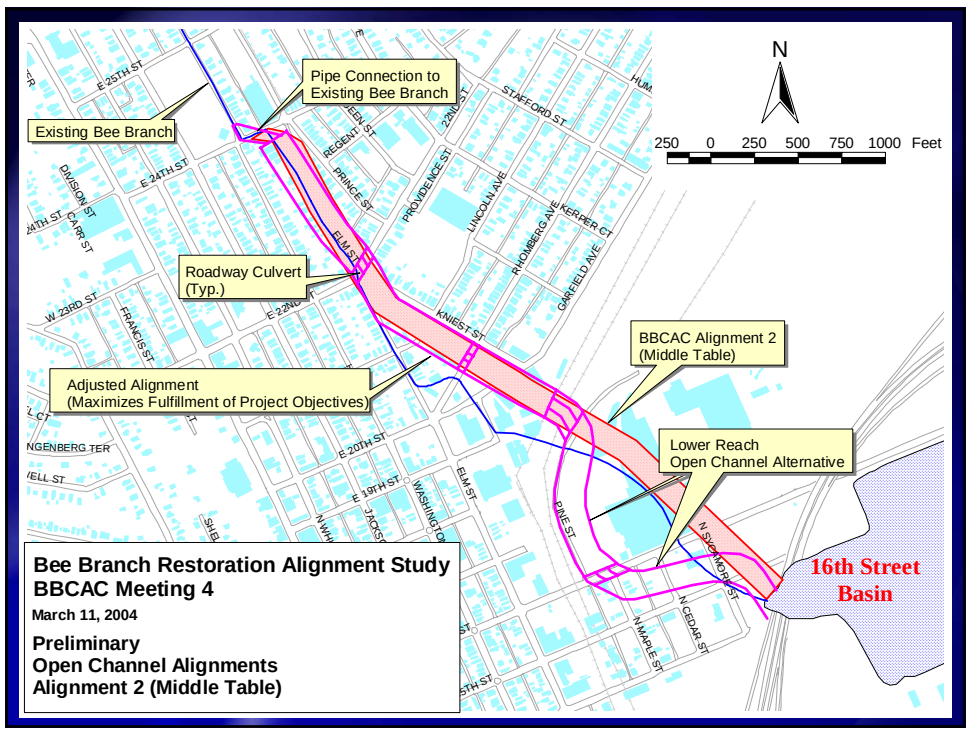
Property Acquisition - Protocol

- Construction Corridor touches primary or detached structure
- Construction Corridor encroaches within 10-ft of primary structure
- Main access is lost due to construction corridor and secondary access cannot be easily established
- Front Lot line: if any portion lost (assumes loss of access)
- Back Lot line: 10-ft loss or more
- Side Lot Line Encroachment: 10-ft loss or more



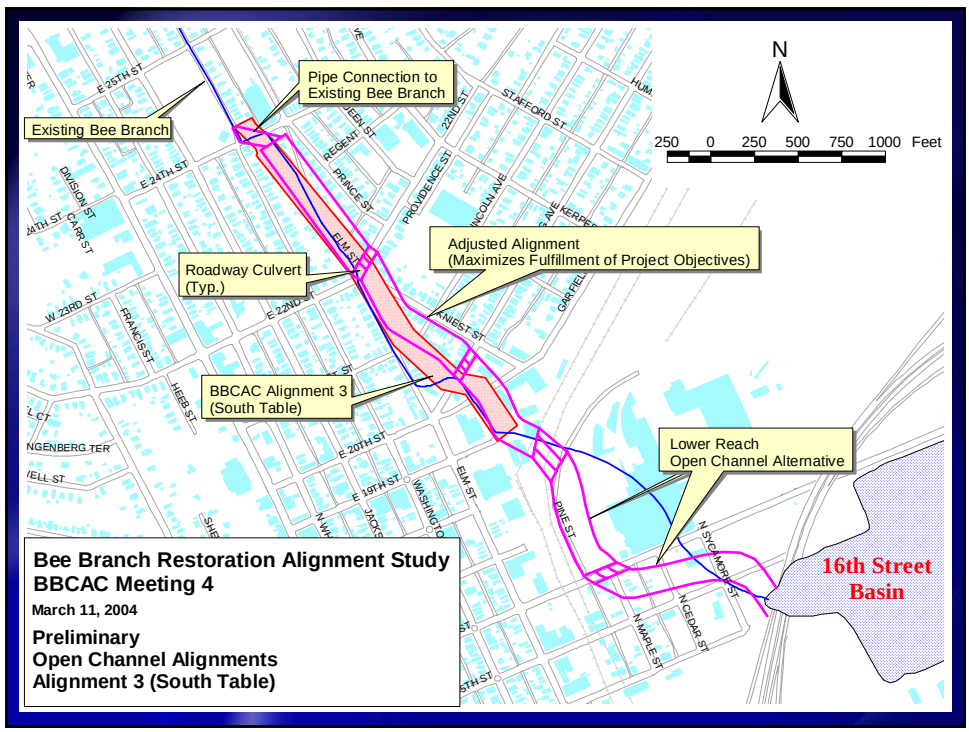
Alignment 1 Modifications

- Alignment was altered slightly to cross perpendicular to streets to minimize road crossing impacts.
- At the intersection of 20th/Rhomberg/Garfield, the alignment was shifted to the east to avoid impacting the gas station and the Eagle grocery store.
- Near the Packing Plant, the alignment was shifted to follow Pine Street to maintain the integrity of the site for future development.
- At the intersection of 15th and Sycamore, the alignment was shifted to the north of 15th to avoid the sanitary sewer lift station.



Alignment 2 Modifications

- Alignment was altered slightly to cross perpendicular to streets to minimize road crossing impacts.
- Near the Packing Plant, the alignment was shifted to follow Pine Street to maintain the integrity of the site for future development.

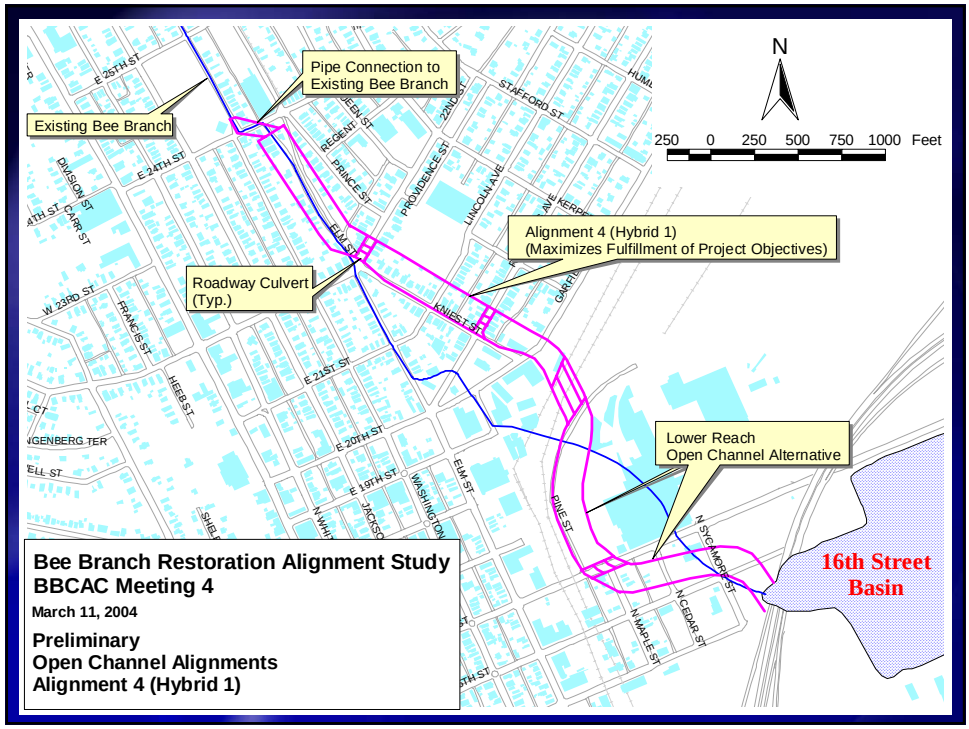


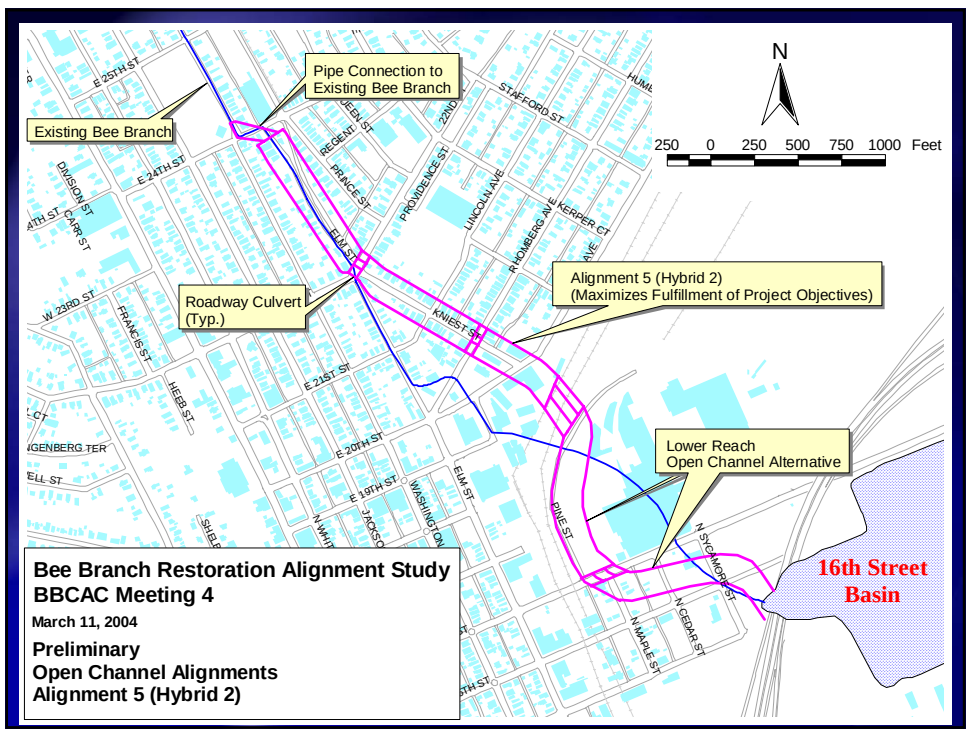
Alignment 3 Modifications

- Open channel begins just south of 24th Street, with new connection pipe constructed to remove 90 degree bends.
- Alignment was altered slightly to cross perpendicular to streets to minimize road crossing impacts.
- The alignment was shifted to be along the centerline of Elm Street between 24th and 22nd instead of at an angle to avoid impacting parcels on Washington Street.
- The portion south of 22nd St. is shifted to avoid the church and gas station properties.
- Section downstream of the railroad tracks was selected to run along Pine Street, cross under 16th Street, and then angle sharply to the east to avoid the sanitary sewer lift station.

Initial Ranking Table

		180-ft Channel Corridor							
		Acquisitions		Roads	Weighted Ranking				
Alignment No.	BBCAC Table / Name	Residential	Commercial / Industrial	Roads Lost or Dead Ended	Preserve Commercial / Non-Commercial Services	Minimize Property Acquisitions	Preserve Neighborhood Access	Total for Initial Screening	Initial Rank
1	North Table	65	19	9	24.0	19.8	12.6	56.4	4
2	Middle Table	69	18	9	22.7	21.0	12.6	56.3	3
3	South Table	65	19	9	24.0	19.8	12.6	56.4	4
4	Hybrid 1	67	12	8.5	15.2	20.4	11.9	47.4	1
5	Hybrid 2	68	17	9	21.5	20.7	12.6	54.8	2
				Weight	2.4	2.1	1.4		
				Description	Prorated to highest acquired (19)	Prorated to highest acquired (69)			


Pipe Connection to Existing Bee Branch
Existing Bee Branch
Alignment 4 (Hybrid 1)
(Maximizes Fulfillment of Project Objectives)
Roadway Culvert (Typ.)
Lower Reach Open Channel Alternative
16th Street Basin
N
250 0 250 500 750 1000 Feet
Bee Branch Restoration Alignment Study
BBCAC Meeting 4
March 11, 2004
Preliminary
Open Channel Alignments
Alignment 4 (Hybrid 1)


Pipe Connection to Existing Bee Branch
Existing Bee Branch
Alignment 5 (Hybrid 2)
(Maximizes Fulfillment of Project Objectives)
Roadway Culvert (Typ.)
Lower Reach Open Channel Alternative
16th Street Basin
N
250 0 250 500 750 1000 Feet
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Alignment 5 (Hybrid 2)

Development of Two Alternatives

- Open Channel
- Pipe Alternative

Alternative Development

- Design Criteria
- Constraints
- Opportunities
- Issues
- Assumptions

Design Criteria- General

- 100-yr Protection
- Freeboard (Design Flood El. To Top of Bank)
  - 1-ft to top of bank
- Side slopes-
  - Permanent- 3 (H): 1 (V) – maximum
  - Temporary- 1.5: 1- assumed

Design Criteria- General (cont.)

- Maintenance Access
  - Open Channel- 15 ft (both sides)
  - Pipe Channel- 15 ft (both sides)
- Channel Treatment
  - Minimize maintenance costs
  - Accessible (maintenance/ emergency)
  - Aesthetically acceptable (Naturalized Channel)
- Reuse portion Existing Bee Branch Sewer
- Minimize Standing Water

Constraints/ Issues

- Development Opportunities
  - Packing Plant
- Development Constraints
  - Existing Gas Station
  - Major Businesses
- Groundwater
- Heritage Trail
- Sanitary Lift Station

Alternative Development

Pipe/Open Channel Concept (typical cross sections)

- What type of channel /pipe is appropriate?

Open Channel Concept:

- Low flow channel
- Grassy overflow channel

Pipe Concept:

- Double box type structure
- Underground with open grassy area on top of the pipes

Open Channel Treatments

Open Channel

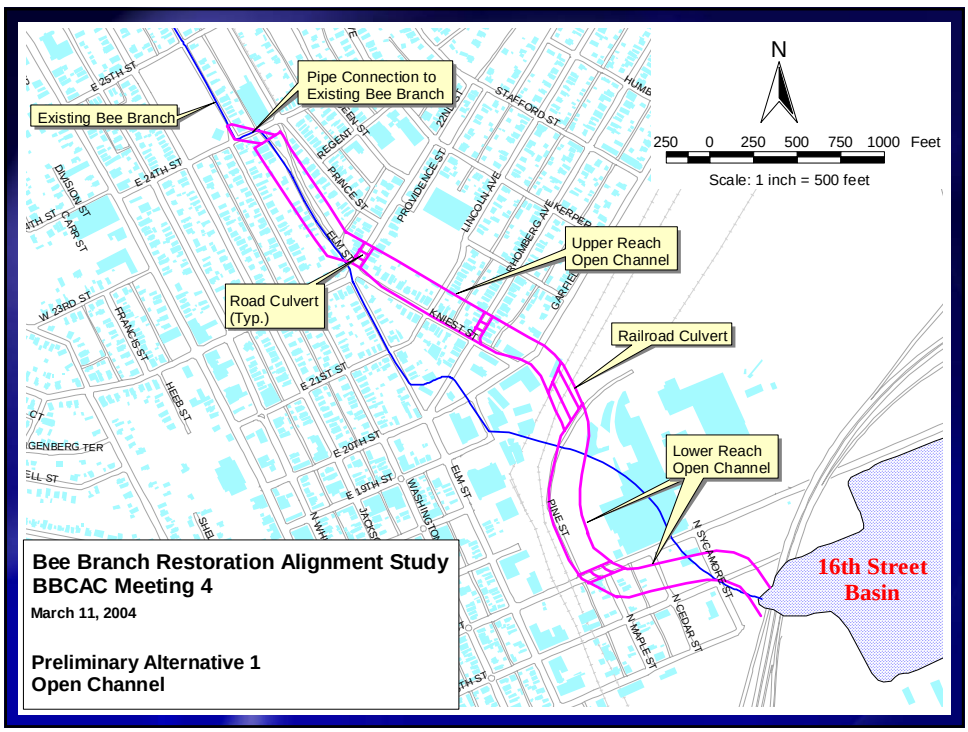
Pipe Photo

Alternatives 1 & 2

- **Open Channel Alternative**
  - Based on Hybrid 1, Alignment 4
  - Includes approximately 4,100 feet of open channel
  - 4 bridges
  - 4 road closures
- **Pipe Alternative**
  - Based on Hybrid 2, Alignment 5
  - Includes approximately 2,740 feet of double box culverts which are 10 feet tall and vary between 28 and 42 feet wide a piece
  - 1,360 feet of open channel
  - 1 bridge
  - 2 road closures

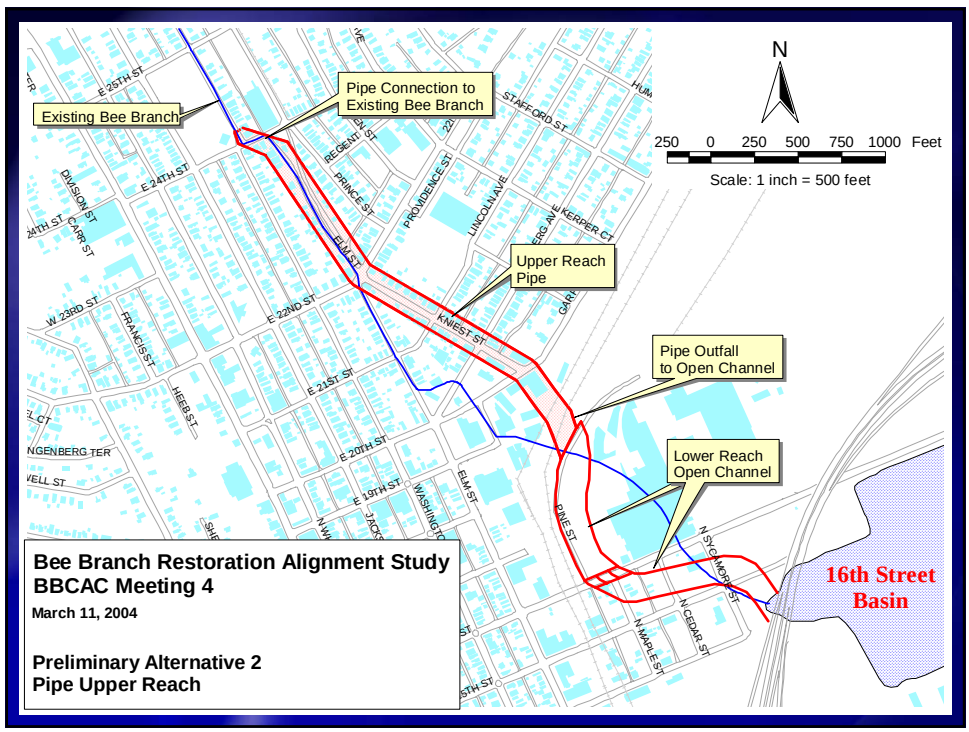
Open Channel

- Open channel below 24th St.
- Channel top width of 180 feet.
- Requires approximately 79 acquisitions subject to the development of an alignment
- Acquisition of 67 houses and 12 businesses
- Cost of $21.6 to $29.8M



Relief Pipe

- Construct additional pipes to expand the capacity of the existing Bee Branch
- 10’ tall double box varying from two 28’ wide to two 42’ wide
- Open channel downstream of railroad tracks
- Acquisition of 58 houses and 16 businesses
- Costs are approximately $30.4 to $42.0 million



Cost Estimate- Base Assumptions

- Property Acquisition (inc. acquisition, demo, reloc.)
  - Residential - $100,000
  - Non-Residential- $150,0000
- Contingency – 35% total
  - Engineering- Design/ Const. Mgmt, Permitting- 15%
  - Construction Costs- 20%

Cost Comparison

Category	Open Channel	Pipe
General	$644,000	$659,000
Acquisitions	$8,500,000 (79 acq.)	$8,200,000 (74 acq.)
Utilities	$788,000	$760,000
Channel	$6,599,000	$3,897,000
Structures/Pipe	$5,027,000	$16,917,000
Subtotal	$21,568,000	$30,433,000
Contingency	$8,182,000	$11,565,000
Total	$29,750,000	$41,998,000

Alternative Evaluation
(table with rankings)

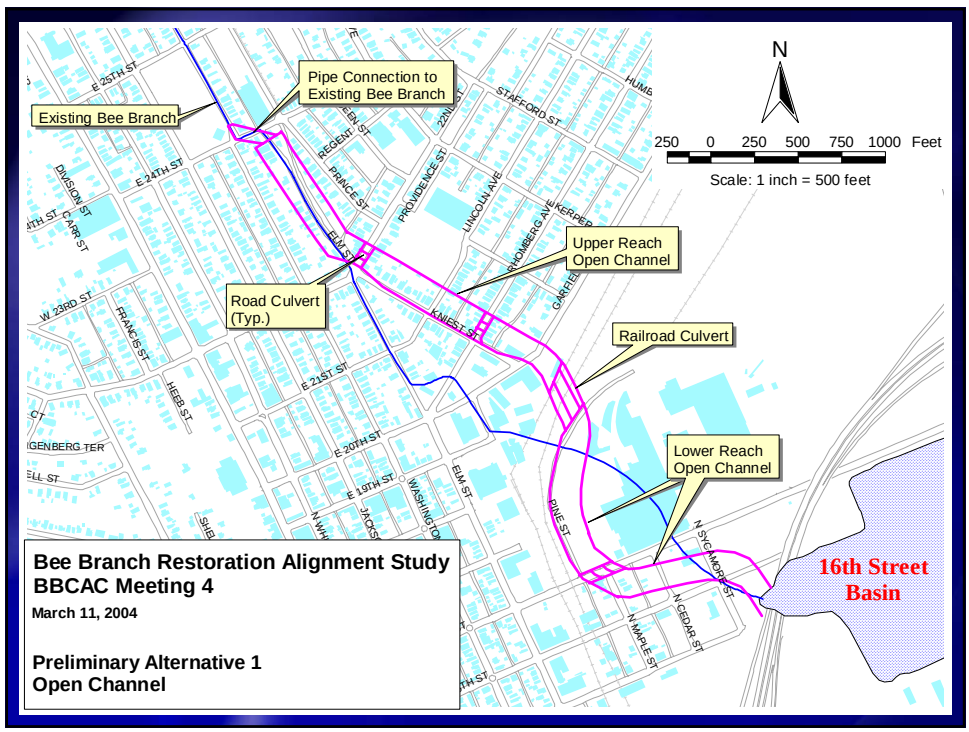
- Preserve Commercial/Noncommercial Services
- Minimize Residential Property Acquisitions
- Minimize Cost
- Preserve Neighborhood Access/Connectivity
- Minimize Health and Safety Risk
- Enhance Quality of Life
- Protect Environment

Alternative Evaluation Ranking

	Alternate 1 - Channel	Alternate 2 - Pipe
	Weighted Score	Weighted Score
Preserve Commercial Services	15.2	20.2
Minimize Residential Acquisitions	20.4	17.7
Minimize Cost	12.8	18.0
Preserve Neighborhood Access	11.9	8.4
Minimize Health & Safety Risks	11.2	5.6
Enhance Quality of Life	0.0	0.0
Protect Environment	-1.0	1.0
TOTAL	70.5	70.9
RANK	1	2

Alignment/Alternative modifications/optimization by BBCAC

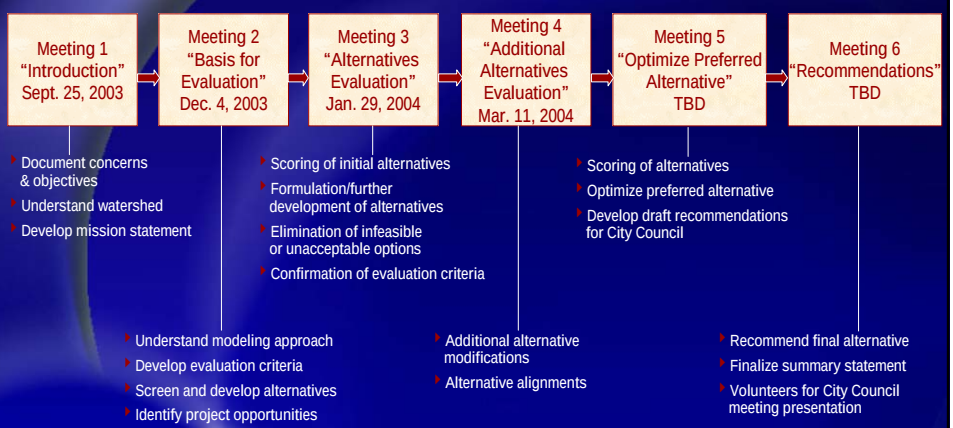
- Receive feedback from the BBCAC as to the most favorable alternative
- Discuss potential modifications or adjustments that CDM can consider for Meeting 5
- Group or full committee modifications?



Alternatives for Meeting 5

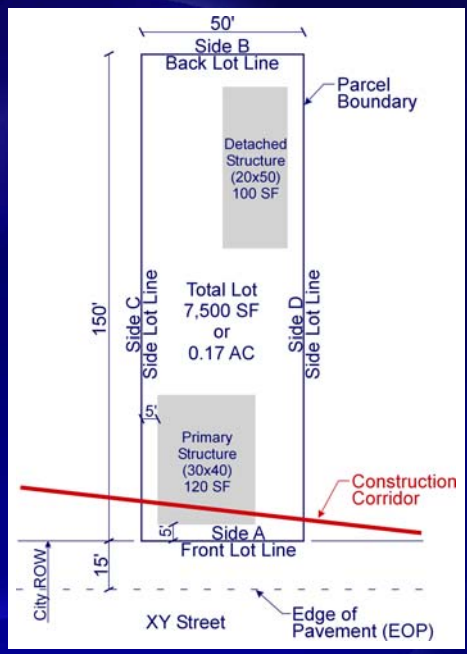
- **Primary Objectives before Meeting 5**
  - **Get direction from BBCAC on which alternative should be considered further**
  - **What modifications or "optimizing" of this alternative CDM should consider in preparation for Meeting 5**

Planning Process



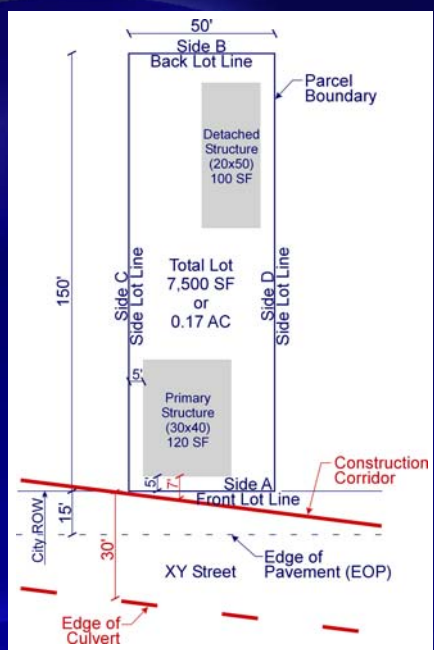
Property Acquisition Screening Criteria – Structure Loss

- Construction corridor touches primary or detached structure



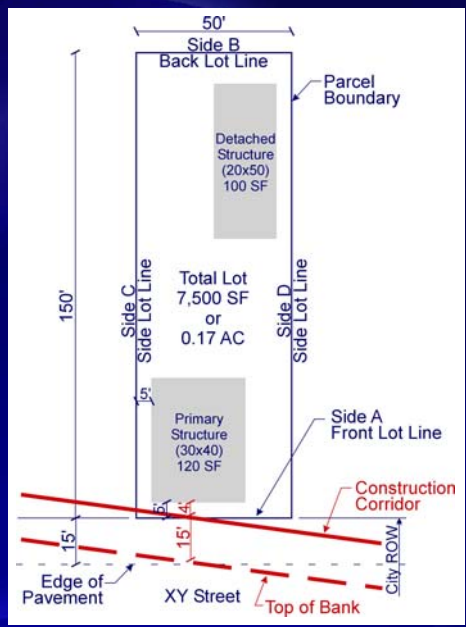
Property Acquisition Screening Criteria – Structure Encroachment of Culvert

- Construction corridor encroaches within 10 feet of primary structure



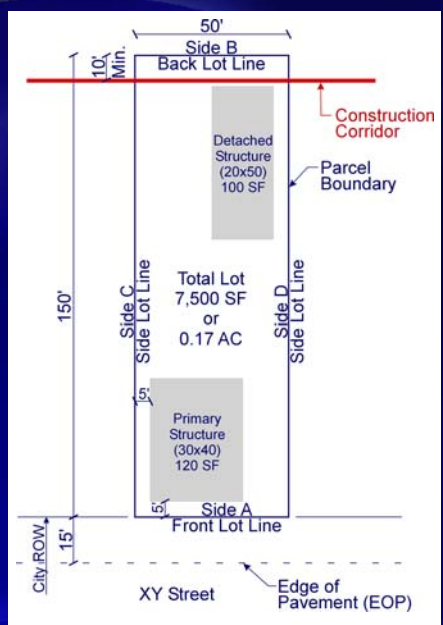
Property Acquisition Screening Criteria – Structure Encroachment of Open Channel

- Construction corridor encroaches within 10 feet of primary structure

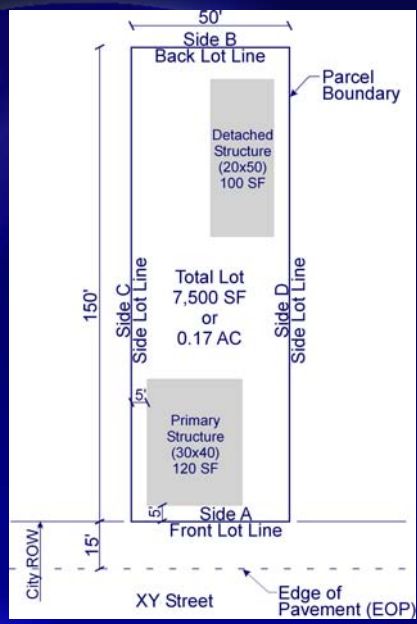


Property Acquisition Screening Criteria – Parcel Reduction

- Construction corridor creates loss of 10 feet or more from back or side lot line



Typical Property- Example



Alignment Considerations

- Site Conditions
  - Topography
  - Geotechnical
    - Groundwater
    - Soil composition
    - Bedrock
    - Slope stability
- Maintenance
  - Construction (temp): 15ft (Open)/ 30 ft (Pipe)
  - Permanent: 15ft (both)

Alignment Considerations

- Street Crossings
  - Traffic Impacts
  - Neighborhood Connectivity
  - Structure Length
  - Crossing Angle
- Utility Conflicts
- Constructability

Next Meeting

- Next Meeting - "Optimize Preferred Alternative"
- April 2004?