CONSENSUS BUILDING AND THE CONCEPTUAL DESIGN PROCESS FOR THE REPLACEMENT OF THE FULTON ROAD BRIDGE

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ABSTRACT

The Fulton Road Bridge, a key component of the City of Cleveland’s bridge inventory, connects the neighborhoods of Old Brooklyn and Brooklyn Centre, two culturally and architecturally significant sections of the city. The existing concrete arch bridge crosses over the Cleveland MetroParks Zoo and has been a highly visible landmark for the community since its construction in 1932. Replacement of the bridge, which consists of six 210’ concrete open-spandrel deck arch spans, has become imperative because of its severely deteriorated condition. This paper focuses on the process followed to build consensus among a diverse group of stakeholders to arrive at a preferred bridge alternative for the replacement of this structure.

Keywords: Concrete Arch, Conceptual Design, Consensus Building

INTRODUCTION

The Fulton Road Bridge, in Cleveland OH, is a seventy year old concrete arch bridge which for many years has carried a significant volume of traffic 100’ above the Cleveland MetroParks Zoo and Brookside Park. Replacement of this concrete open-spandrel deck arch bridge, which was constructed in 1932, has become imperative because of its severely deteriorated condition.

Because of its location inside the grounds of the Cleveland MetroParks Zoo, which is patronized by over a million visitors each year, the bridge has long been a highly visible structure and an important symbol to the community. In addition, the bridge is one of the few of its type and era still in use in the Ohio. For this reason, great care has been taken to solicit and implement feedback from stakeholders and the general public on plans for the bridge’s replacement. A bridge alternative study has been performed to evaluate feasible replacement bridge types, focusing on maintaining the unique character and significance of the structure and minimizing negative impacts to the Zoo.

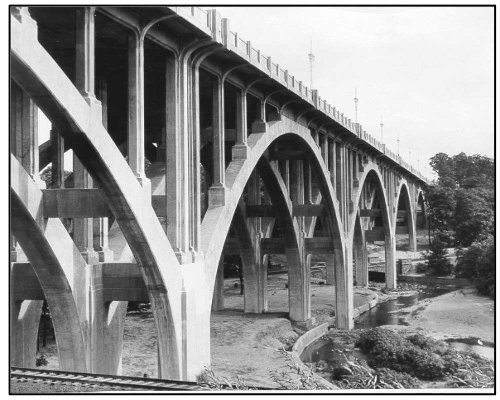
After evaluating a number of conceptual and preliminary bridge replacement types, three feasible alternatives were advanced for more detailed study and presented to the community in a public forum. The three feasible alternatives consisted of two precast concrete deck arch concepts and a concrete delta frame concept. Preliminary structural analyses were performed to prepare construction cost estimates and determine approximate member sizes for generating three dimensional renderings and animations. These were then presented to the public for viewing and comment. Based on preliminary engineering and public input, a preferred alternative has been selected and advanced to final design, which is currently underway.

PROJECT BACKGROUND

The conceptual design undertaken in this phase of the project has been performed in response to ongoing deterioration in the structure that has posed growing safety concerns to the public. These concerns are of particular importance in light of the significant pedestrian traffic that passes beneath the structure. The conceptual design phase followed a number of previous efforts to address concerns with the deterioration of the bridge. The conceptual design effort also encompassed addressing a number of environmental, cultural and historic issues associated with the replacement of the structure. The prominence of the structure, its location in a culturally significant neighborhood, and its visibility from afar have provided the incentive for an extensive bridge concept development effort assisted by significant input from key stakeholders and public involvement.

EXISTING BRIDGE

The Fulton Road Bridge was constructed in 1932 and consists of six 210-foot concrete open-spandrel cast-in-place deck arch spans and concrete approach spans at the north and south ends of the bridge. The overall length of the bridge, including approach spans, is approximately 1,600 feet. Four lines of arch ribs support the deck, which is a flat-slab that is integral with the spandrel columns. Piers at the ends of each arch rib are supported on individual pedestal footings, which bear directly on rock.



View of Fulton Road Bridge, 1932

The structure carries four lanes of vehicular traffic over the Cleveland MetroParks Zoo, Big Creek, John Nagy Boulevard, and the Norfolk Southern and CSX railroad lines (two active tracks). As a result of the structure's age and long-term exposure to deicing chemicals, significant deterioration has occurred, including moderate to severe spalling of concrete and exposure and corrosion of reinforcing steel.

Deterioration of Existing Structure

Repairs were performed in 1997 to address the most deteriorated sections of the bridge, and numerous shielding structures were erected over the Zoo to protect the public from falling concrete. The repairs carried out on the structure were primarily temporary in nature and not appropriate for long-term maintenance of the structure. The repairs have not effectively prevented further deterioration of the structure. Because of the extensive nature of the deterioration on the structure, rehabilitation of the structure was not judged to be a practical alternative to full replacement of the bridge. In early 2004, the outer lanes on the structure were permanently closed to traffic, reducing the number of lanes on the bridge from four to two.

ENVIRONMENTAL, CULTURAL AND HISTORIC ISSUES

The existing Fulton Road Bridge possesses a number of unique characteristics that originate primarily from its appearance and its location. The bridge crosses over the Cleveland MetroParks Zoo and is very visible from Brookside Park, Interstate I-71, and Pearl Road. The Zoo annually takes in more than one million visitors, and the bridge has become an enduring symbol for the area. The concrete cast-in-place deck arches comprising the structure give the bridge a unique appearance that is considered very desirable to maintain in this prominent site.

Because of the significance of the existing structure and sensitivity of the bridge site, a considerable effort was undertaken to identify environmental, cultural and historic issues that could impact the selection of feasible bridge types. The following list summarizes key issues:

- Proposed National Register of Historic Places Nomination – In April of 2003, the City of Cleveland and Cuyahoga County were notified of the nomination of the Fulton Road Bridge to the National Register of Historic Places (NRHP). This nomination, made on behalf of a local historic group, was based on the fact that the structure was one of only three known arch bridges in the nation to incorporate integral flat-slab construction over spandrel columns, the fact that the structure has unique aesthetic features, and the fact that the structure has six of the eight longest concrete arch spans built in Ohio. This nomination was refuted by the City and the County on the basis of the bridge's deteriorated structural integrity, and the refutation was upheld by the Ohio State Historic Preservation Office (SHPO). This nomination affected the selection of feasible bridge replacement alternatives in that the nomination reflected a key objective of this project in the eyes of the community, namely to maintain the appearance and form of the existing arch structure.

- Brookside Park Bridge under Fulton Road Bridge – The Brookside Park Bridge is a three-hinged concrete arch which was constructed almost 100 years ago (1909) and currently carries pedestrian traffic in the MetroParks Zoo directly under the Fulton Road Bridge. This structure is on the Ohio Historic Bridge Inventory and must be protected during removal of the existing bridge as well as construction of the new bridge. The presence of the Brookside Park Bridge affected the evaluation of constructability for each of the bridge concepts.

Brookside Park Bridge and Big Creek Under Fulton Road Bridge

- Big Creek – Big Creek runs directly under the Fulton Road Bridge and flows nearly parallel to the alignment of the bridge near its center spans. Demolition of the existing bridge and construction of the new bridge must take place within the limits of Big Creek. In addition, the creek will affect access to certain portions of bridge during construction. The presence of the creek, like the historic Brookside Park Bridge, will affect the means available to the contractor for construction of the new bridge, and influence the types of bridge construction available and practical.

- Stakeholder Preference / Public Input – Because of the sensitive nature of the bridge replacement, receiving input from the public and key stakeholders was critical to successfully identifying a preferred replacement alternative. In an effort to understand issues of the bridge replacement considered to be important in the minds of stakeholders, the design team organized a series of meetings to discuss key issues and receive feedback. This effort is described in more detail below.

Railroads Beneath Fulton Road

- Railroad Coordination – The Fulton Road Bridge crosses over two sets of tracks near the north end of the bridge. These tracks are operated by CSX and Norfolk Southern. Measures will need to be taken during construction to ensure that negative impact to the operation of the railroads is minimized and to ensure that the tracks are not damaged during demolition or construction. Consideration of impact on the railroads during construction was a significant factor in the evaluation of constructiblity for bridge replacement types.

- Zoo Operations – The bridge spans directly over the Cleveland MetroParks Zoo, with more than 1 million visitors per year. Portions of the bridge are in close proximity to animal enclosures and other facilities in the Zoo, and pedestrian trails are located directly under two spans of the bridge. Noise, vibration and reduced air quality from demolition and construction, as well as limitations on access to portions of the Zoo during the bridge replacement, have potential for negative impact on Zoo operations. The constructability evaluations have consequently taken into account the minimization of negative impact and the most favorable construction sequencing to maximize access to affected portions of the Zoo.

Potential Impact to Zoo Operations is Significant

GEOMETRIC REQUIREMENTS

The issues described above helped to establish some overall geometric constraints for the new replacement bridge. These general parameters included the overall form of the bridge, the span lengths, pier locations, and vertical clearance limitations. Specifically, the following geometric parameters were decided upon at the outset of the preliminary design after careful consideration of the key issues described above.

- Most importantly, because of the strong sentiment and attachment to the existing arch bridge, it was decided prior to the development of replacement alternatives that the new bridge would be "arch-like" in appearance. Even with this requirement, a wide range of structure types could still be appropriate, as is discussed in more detail below.

- Similarly, because of the appeal of the existing structure's appearance, it was decided that a dramatic change in span lengths from the existing 210' spans would not be desirable. More importantly, to limit the impact to the Zoo and Brookside Park as described above, and to minimize right-of-way acquisition, it was deemed important to maintain piers at the existing pier locations wherever possible.

- The presence of the two railroads at the north end of the structure introduced vertical clearance requirements that affected the permissible structure depth at this location. Since the bridge is very high over the valley, this would not prevent the use of normal structure depths for typical multi-girder structures, however it does have an impact on the geometry of supporting arch ribs for deck arch structures.

These geometric parameters, established early in the conceptual design, provided focus for the development of bridge replacement alternatives and put some practical limitations on feasible replacement types. By establishing these parameters early in the design, the determination of the preferred bridge replacement type was facilitated by eliminating some clearly inappropriate structure types from the beginning and negatively or positively affecting the evaluation of others.

CONCEPT DEVELOPMENT

The development of appropriate concepts for the replacement of the Fulton Road Bridge was carried out in a systematic process whereby the design team started with a wide range of possible structures, and in a step-by-step fashion, with the guidance of a Technical Advisory Committee (see below), narrowed the options to a final preferred alternative. The process of eliminating concepts and determining a final preferred alternative was performed by measuring alternatives against a well-defined set of evaluation criteria, which were weighted on the basis of perceived importance and impact on the overall success of the project. A straightforward evaluation matrix was developed to rank alternatives in a quantitative fashion and to determine three feasible alternatives, which were then further developed from an engineering design standpoint and subsequently formally presented to the public for open selection.

TECHNICAL ADVISORY COMMITTEE

A critical component of the design team's approach to the concept development was the formation of a Technical Advisory Committee (TAC) to supervise the development and evaluation of bridge replacement concepts. The TAC group was comprised of the design team members along with key technical staff from the major stakeholders involved in and most directly impacted by the project, including the following:

- Cuyahoga County (OH) Engineer's Office
- City of Cleveland
- Ohio Department of Transportation
- Cleveland MetroParks Zoo
- Federal Highway Administration

Numerous departments and interests of each of the stakeholders listed above were also represented in the TAC group. The main functions this group provided in the conceptual design phase of this project included the following:

- Liaison between the design team and important stakeholders and community groups with significant interest in the project;
- Direction on the development of evaluation criteria used to assess bridge replacement concepts, as well as comparative weighting of evaluation criteria;
- Technical assistance with evaluation of alternatives against these evaluation criteria;
- Assistance with communicating decisions and potential replacement alternatives to the public.

Of the many valuable functions provided by the Fulton Road TAC, the ability to assist in communicating design decisions to the public has proven especially beneficial. This has allowed the design team and the key technical stakeholders to speak with one voice and communicate a consistent message to the public, and has consequently made reaching a consensus on bridge replacement much easier. In addition, since all major parties were involved in the TAC, decisions made by the committee carried more weight and allowed the concept development to move along efficiently and consensus to be reached more quickly.

CONCEPT PRESELECTION

With the goal in mind of replacing the Fulton Road Bridge with another structure "arch-like" in appearance, the design team initially developed twelve different alternatives for the bridge replacement. Each of these alternatives fit the criteria, to greater or lesser degrees, of being "arch-like" in appearance, even though several were not true arch-type structures. The twelve preliminary alternatives examined were:

- Cast-in-Place Deck Arch (complete structure replacement)
- Cast-in-Place Deck Arch (rehab existing arch ribs, use to support new deck)
- Multi-Girder with Existing Arch Ribs (rehabilitate arches and use as non-structural elements)
- Precast Deck Arch (precast arch ribs, girder superstructure)
- Precast Deck Arch (precast segmental arch ribs and superstructure)

- Precast Concrete Segmental Box Girder
- Cast-in-Place Concrete Segmental Box Girder
- Steel Deck Arch
- Steel Through Arch
- Steel Multi-Girder
- Concrete Multi-Girder
- Concrete Rigid Frame

Each of these concepts was evaluated on the basis of the following eleven preliminary criteria, and rated as either 'Favorable', 'Neutral', or 'Unfavorable' in each category:

- Construction Impact
- Aesthetics
- 'Arch-type' Conformance
- Maintenance
- Initial Cost
- Life Cycle Cost
- Arch Demolition Required
- Use of Existing Foundations
- Conventional Construction Methods
- Construction Schedule
- Stakeholder Preference

These eleven preliminary evaluation criteria reflect the major concerns of the TAC committee in the early stages of the conceptual design. Each of the preliminary criteria were treated with equal importance in this stage of the selection process, and the evaluations of the preliminary bridge alternatives were subjective on the basis of their favorability against these criteria. This subjective, non-quantitative evaluation allowed for the elimination of several concepts and the definition of six preliminary alternatives for further development:

- ***Cast-in-Place Deck Arch (complete structure replacement)*** – This concept was advanced for further study because it gave the best opportunity to recreate the appearance of the existing bridge.

- ***Multi-Girder with Existing Arch Ribs (rehabilitate existing arch ribs and use as non-structural elements)*** – This concept was advanced because it achieved the look of the existing bridge without requiring the removal of the existing arch ribs.

- ***Precast Deck Arch*** **–** Because they were similar concepts, the precast arch rib and segmental precast arch rib with segmental superstructure concepts were combined and advanced for further study. Both concepts represented a precast solution similar to the cast-in-place deck arch concept, with similar aesthetics and with less impact to the zoo during construction.

- ***Concrete Segmental Box Girder*** **–** The precast and cast-in-place segmental box girder concepts were combined and advanced for further study. The concrete segmental box girder concept (whether precast or cast-in-place) represents the least impact to the zoo during construction, with the possibility of erection taking place from above the structure, rather than from below, and was advanced for further study primarily on the strength of this advantage.

- ***Steel or Concrete Multi-Girder*** – The steel and concrete multi-girder concepts were likewise combined and advanced as one concept. The multi-girder concept was expected to represent the most economical alternative, both from an initial cost and a life-cycle cost standpoint.

- ***Concrete Delta Frame*** – The concrete delta frame concept was advanced for further study because it represented a practical compromise between the more economical multi-girder alternative and the true arch alternatives, which better imitate the appearance of the existing structure.

These six preliminary alternatives were further developed and studied in more detail in the next stage of the evaluation process. Preliminary engineering was applied to each of the alternatives to objectively evaluate them against specific criteria described in the next section. The engineering performed on the six preliminary alternatives focused on establishing a general understanding of the following:

- <u>Approximate member sizes</u> – Some preliminary analysis was carried out to determine an approximation of the expected sizes of the structural members for each alternative. This was important to establish the overall appearance of each alternative.

- <u>Assumed Erection Method</u> – The design team developed preliminary erection schematics for each concept, reflecting our understanding of how each would be constructed. Preliminary discussions were carried out with contractors at this stage to better understand the assumed erection method for each alternative. This effort was important to allow for an evaluation of the expected impact on the zoo during construction.

- Estimated costs – A estimate of approximate initial cost was developed for each alternative, as well as an understanding of long-term maintenance demands and life cycle costs.

EVALUATION OF PRELIMINARY ALTERNATIVES AND DETERMINATION OF FEASIBLE ALTERNATIVES

Based on the further engineering and analysis of the preliminary alternatives, the next objective of the design team was to determine three feasible alternatives which best met a series of objective criteria. This was accomplished by evaluating and ranking each of the six preliminary concepts according to the following key criteria:

Aesthetics - For the reasons of visibility and cultural significance, aesthetics was a very important criterion for evaluating the bridge concepts on the following factors:

- Does the alternative resemble the appearance of the existing structure;
- Does the alternative exhibit clean lines and graceful shapes, or present a cluttered appearance;
- Does the alternative accommodate creative architectural enhancements;
- Does the concept create a physical barrier between different sections of the Zoo, relative to the existing structure;
- Since the structure is viewed from below by thousands of Zoo patrons, how does the structure appear from the ground level;
- Since the structure is visible from Interstate I-71 and from the Brooklyn-Brighton bridge, does it exhibit pleasing aesthetics from a distance

Stakeholder Preference - This criterion is a measure of the reaction of key stakeholders to the appearance of the structure and an assessment of the extent to which the local communities could be expected to accept and embrace the bridge. It is also a reflection of the extent to which the new structure met the standard of being an "arch-like" structure. The assessment of stakeholder preference was based primarily on meetings that the design team held with key stakeholders at the outset of this phase of the project.

Initial Cost - This criterion is an evaluation of the estimated initial cost of construction for each alternative. Initial cost estimates were approximate at this stage of the conceptual bridge type evaluation, and were based on approximate structural quantities that were been determined from preliminary engineering analysis. Historical data, recent bid tabulations in the general geographic area, and discussions with contractors, fabricators, erectors and others with insight into bridge construction and demolition costs were also incorporated.

The following table shows estimates of approximate costs that were determined at this early stage for each bridge type:

Bridge Type	**Preliminary Approx. Structure Cost Estimate ($ per square foot)**	**Preliminary Approx. Structure Cost Estimate (Millions of $)**
Cast-In-Place Concrete Deck Arch	$350 - $400	$45M - $51M
Precast Concrete Deck Arch	$275 - $350	$35M - $45M
Multi-Girder w/Existing Arch Ribs	$225 - $275	$29M - $35M
Segmental Concrete Box Girder	$300 - $350	$39M - $45M
Steel or Concrete Multi-Girder	$200 - $225	$25M - $29M
Concrete Rigid Frame	$275 - $325	$35M - $42M

<u>Construction Impact</u> - This criterion evaluated the extent to which erection of the bridge alterative would result in significant temporary or permanent impact on the surroundings, including the MetroParks Zoo beneath the bridge. Among the factors influencing each alternative's evaluation for construction impact were the following:

- Would the alternative require demolition and removal of the existing arch ribs;
- Would construction disrupt the flow of pedestrian traffic in the Zoo;
- Would construction require closure(s) of the Norfolk Southern or CSX railroad lines beneath the structure, and if so, for how long;
- To what extent would demolition and/or construction of the new bridge impact the existing Brookside Park Bridge;
- Would the alternative require additional right-of-way purchase for foundations;
- Would the alternative require temporary falsework for a significant period of time in Big Creek, on MetroParks walking paths, or in close proximity to the railroads;
- Would construction affect vertical or horizontal clearance at the railroads;
- Will heavy equipment be needed and will the equipment damage portions of the Zoo;
- Will noise, vibration, or reduction in air quality affect the Zoo animals;
- Would the alternative require delivery of large or heavy bridge elements that may affect traffic in the area of the bridge.

<u>Constructability</u> - Each alternative was evaluated on the basis of the ease of construction and the extent to which complexity and the potential for delays or problems in construction were minimized. Factors influencing constructability rating were:

- Would the alternative maximize the use of local labor and materials;

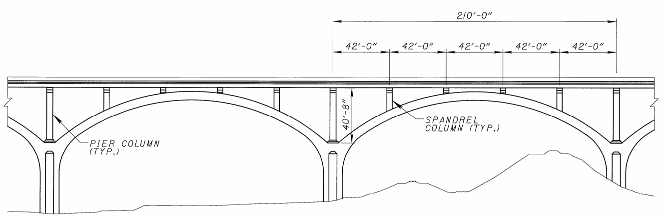
- Is the construction method required for the alternative too complex or unusual for local contractors to confidently bid;
- Would the construction method add excessive time to the construction schedule;
- Would the construction method require excessive falsework or temporary works, or non-typical construction equipment which is unfamiliar or unavailable to local contractors;
- To what extent would out-of-state fabricators and/or specialty contractors be needed.

Future Maintenance and Life-Cycle Costs - Future life-cycle costs refer to expenses that recur over the life of the structure that are necessary to maintain the functionality, serviceability and safety of the structure. Differences in expected future maintenance and life-cycle costs between alternatives were addressed and evaluated in general terms, including the following:

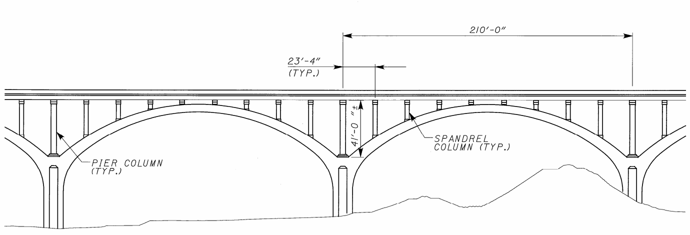
- Requirements for deck replacement
- Requirements for bearing and expansion joint maintenance and replacement
- Requirements for deck overlay
- Requirements for painting of structural steel elements
- Anticipated complexity and cost of periodic inspections
- Overall anticipated durability of the structure

At this stage, the design team and the TAC committee cooperatively rated the preliminary concepts on a scale from one to ten on each of the evaluation criteria. These ratings resulted from extensive discussion among the TAC committee members from which a consensus was achieved on both the ratings and the weighting of the importance factors for each criterion. Each criterion was assigned a weight factor in relation to its perceived relative importance. An overall score for each preliminary alternative was then calculated based on the sum of the ratings multiplied by the weighting factor. In this manner, the three feasible alternatives were identified:

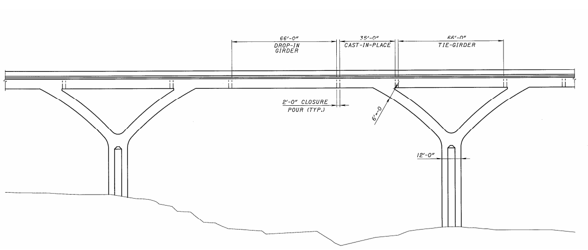
Feasible Alternative A - Precast (Contemporary) Concrete Arch – This alternative is a precast concrete arch bridge with 210-foot long main arch spans similar to the existing structure. This alternative employed the use of modern materials and construction methods with four spandrel columns in each span, giving the structure more open space and a more ‘contemporary’ appearance than the existing bridge.



Feasible Alternative B - Precast (Traditional) Concrete Arch – This alternative is intended to match, as closely as possible, the appearance of the existing bridge. A cast-in-place concrete deck arch similar to the existing bridge evaluated very positively compared to other alternatives, primarily on the strength of its aesthetics and on the basis of stakeholder preference. Recognizing the impact that the formwork required for a cast-in-place solution would have on the park and zoo, this alternative attempted to recreate the appearance of the existing bridge with precast elements rather than cast-in-place elements.



Feasible Alternative C - Concrete Delta Frame - The third feasible alternative was a precast concrete delta frame bridge with 210-foot long main spans. This alternative represents a more significant visual departure from the existing bridge than Alternatives A and B. The delta frame was made to appear more 'arch-like' by increasing the curvature of the supporting legs at the piers. The resulting structure provided a more modern-looking appearance with increased open space between spans and a more streamlined appearance to the bridge.



PUBLIC INVOLVEMENT PROCESS AND SELECTION OF PREFERRED ALTERNATIVE

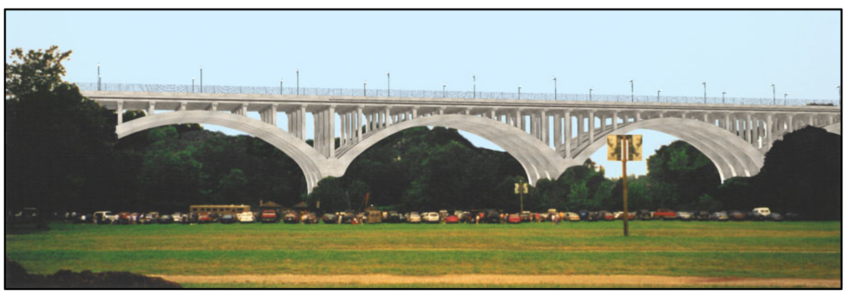
Input from the public on the selection of a preferred alternative followed the identification of the three feasible alternatives described above. An important element in successfully achieving a preferred alternative is that the TAC committee, with the design team, worked carefully to make sure that all of the feasible alternatives shown to the public were constructible at this bridge location and could be funded with available resources. No options were communicated to the public as potential replacement alternatives until a reasonable level of confidence was obtained that the alternative could meet these key criteria. In this way, the design team and the TAC reduced the possibility the emergence of a bridge concept that ultimately could not be built or could not be funded by the client.

At the same time, input on a variety of issues associated with the project was obtained from key technical stakeholders and community stakeholders at various stages of the concept development, as described below. After defining the three feasible alternatives a public meeting was held during which the public was asked to select a preferred alternative.

VISUALIZATION TOOLS

To effectively communicate ideas and concepts to stakeholders and the public, a variety of visualization tools were employed:

- Renderings – Color renderings were essential to communicate the overall size and form of each of the alternatives. For the three feasible alternatives, renderings were developed from eight different vantage points around the bridge site.



Examples of Computer Renderings

- Animations – Animated rendering sequences were produced for each of the three feasible alternatives to simulate walking beneath the structure as well as driving on the deck. The animated models were produced with careful attention to not only the bridge but the surrounding buildings and topography of the Zoo and park.

- Panoramics – This tool uses computer software to place the user in a specific location relative to the bridge and its surrounds, and allow the user to zoom in and out and rotate views 360^{o}, to simulate the experience of standing at a given location and viewing both the bridge and all of its surroundings.

- Website – All of the visualization tools, as well as extensive background information on the project, was placed on a public website, to be available to all of the public an any time. In addition, the website allowed the public to provide comment and to select a preferred alternative from the three feasible bridge options.

STAKEHOLDER MEETINGS

Meetings were held with key community stakeholders who were not involved with the TAC committee, including local neighborhood groups, city and county agencies, city councilpersons, public agencies, utilities, and affected business and schools, at various points in the concept development and selection process. Primarily, these meetings were conducted as described below, with occasional additional stakeholder meetings taking place on an as-needed basis:

- *At the outset of the project.* Before conceptual bridge alternatives were developed, meetings were held between the design team and the community stakeholders. The purpose of these meetings was to inform each group of the goals of the project and give each group an opportunity to voice concerns specific to their interests. Input from the stakeholders on bridge concepts at this stage was limited was limited to general comment, such as conveying strong preferences and identifying unacceptable alternatives. The design team was careful at this point not to present any bridge types or concepts as practical alternatives for the stakeholders to evaluate.

- *After identification of feasible alternatives.* After the three feasible alternatives were identified, and before the public meeting was held, an additional round of meetings was held with selected stakeholders to give them the opportunity to critically assess the alternatives in a face-to-face manner with the design team. This also gave the design team an opportunity to address specific concerns with key stakeholders before the public meeting and garner support from these stakeholders, which helped facilitate a successful public meeting.

PUBLIC MEETING

In accordance with the National Environmental Policy Act (NEPA) and Section 106 process, an open-house format public meeting for the Fulton Road Bridge Replacement project was held. Representatives from the design team and TAC committee were available to answer project-specific questions and to address comments and concerns. In addition, a short presentation was given to summarize the project.

Comment sheets were made available at the meeting, distributed to local public libraries, and made available on the project website. The public was asked to choose a preferred bridge design from the three feasible alternatives, and was given approximately two months to submit their selections and general comments to the design team. Voting by the public on bridge alternatives was then used in the selection of a preferred alternative, as described below.

PREFERRED ALTERNATIVE

At the conclusion of the public meeting and after all comments were received from the public, the Contemporary Concrete Arch alternative was selected by the TAC committee as the preferred alternative on the basis of the following:

- This concept received more votes from the public than the other feasible alternatives. Also, the written comments received from the public were strongly in favor of replacing the existing structure with another arch structure.

- With fewer structural components (spandrel columns and beams) than the Traditional Concrete Arch, this alternative was deemed to be more conducive to a shorter construction schedule.

- With fewer structural elements, this alternative was expected to be easier and more economical to inspect and maintain than the Traditional Concrete Arch.

- This alternative was estimated to have a total project cost of approximately $48 Million, which is slightly lower than the estimates for the other feasible alternatives.

Preferred Alternative – "Contemporary" Precast Concrete Arch

CONCLUSIONS

For this project, a systematic process has been followed which has led to the successful identification of a preferred bridge replacement alternative for a highly-visible 70-year old concrete arch structure in a culturally-significant section of Cleveland, OH. The preferred alternative represents a constructible alternative which preliminary estimates indicate can be built with the funds available and which satisfies the majority of the concerns of the public and key stakeholders. The successful identification of a preferred bridge replacement alternative was facilitated by the following:

- The formation of a Technical Advisory Committee of key technical stakeholders, guiding the bridge selection process and working cooperatively with the design team to communicate decisions to the public and efficiently achieve consensus as the project progressed;

- A systematic approach to narrowing a large number of bridge concepts down to a single preferred alternative, incorporating well-defined evaluation criteria and consideration of the relative importance of criteria;

- Individual community stakeholder meetings to allow affected members of the community to understand the project goals and constraints and to provide input to the design team on a face-to-face basis;

- State-of-the-art visualization tools to effectively communicate the form and appearance of all alternatives to the public and other stakeholders;

- A controlled approach to public involvement which avoided the presentation of alternatives to the public until a confidence level was obtained that the alternative was constructible and could be built with the funds identified for the project.

Final design of the preferred alternative is currently underway and will be completed by the end of 2005. The new Fulton Road Bridge is currently scheduled to be open to the public by the end of 2007.