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REPORT

Structure Type, Size and Location Bond Falls State Park Pedestrian Bridges Over the Middle Branch of the Ontonagon River

July 1, 2002

Prepared for:

State of Michigan
Department of Management and Budget
P.O. Box 30026
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I. INTRODUCTION

A. Purpose

The purpose of this report is to convey NDG's recommendations for the proposed replacement of the pedestrian bridges over the Middle Branch of the Ontonagon River at the newly created Bond Falls State Park near Paulding, Michigan.

B. General Site Description

The proposed bridge replacement is located in Section 1, T46N, R39W, Haight Township, Ontonagon County. There are two existing bridges crossing the river. One bridge has a clear span of approximately 62' while the second bridge is a two-span bridge with a total length of approximately 84'. The existing bridges are timber pole stringer structures with dimensional wood decks and railing systems. The pole stringers are supported on rock-filled timber cribs. The existing bridge structures are located approximately 120' - 140' downstream from the base of the Bond Falls.

Northwest Design Group performed a preliminary topographic survey to determine the existing ground profile in the area of the proposed bridges and viewing platforms. This data has been used to generate the General Plan of Site, provided in Appendix D. Additionally, we performed six shallow hand auger borings to gather information on the soils in the area of the proposed bridges and platforms. In general, the soils consisted of silty sand of varying depths above fractured rock. Rock was encountered at approximately 3' - 4' below grade in the vicinity of the proposed bridge abutments.

II. DESIGN FACTORS TO CONSIDER

A. Hydrology/Hydraulics

Design discharges for this project, as stated in the e-mail from MDEQ dated June 10, 2002, are 350, 700, 1,000, 1,500, 1,900, 2,400, 2,900 and 3,700 cfs, which correspond to the 2, 5, 10, 25, 50, 100, 200 and 500 year peak flows, respectively. This data is based on Watershed Basin No. 53 Ontonagon. The Michigan DEQ Permit No. 02-66-016-P dated 05/16/2002 that has been obtained for this project indicates that the bridges must be designed to be above the 100 year flood elevation. This permit also requires the viewing platform framing to be above the 100 year flood elevation and the foundation is required to be of a pile type system such that they do not interfere with the flow of the flood waters. Our preliminary hydraulic analysis, based on our survey data and the above noted flow information, indicates that the water elevation for the 100 year flow rate is at an elevation of approximately 98.4 feet at the centerline of the existing bridges.

B. Accessibility

The mission of this project is to provide waterfall viewing opportunities to users with varied degrees of mobility. In addition to the subject bridges, walkways, boardwalks and viewing platforms are planned to provide various viewing opportunities of the falls.

Based on the American National Standard Accessible and Usable Buildings and Facilities (ANSI A117.1-1998) the space allowance for a person in a wheelchair is to be a minimum of 30" wide and 48" long. Due to the anticipated lengths of the two bridges, it is conceivable that two wheelchairs would need to pass each other on either of the bridges. Therefore, the minimum clear width (within the guardrails) of the bridges is 60". However, due to the siting of the bridges (within view of the falls), it is also conceivable that a wheelchair would be turned perpendicular to the bridge span to view the falls, while a second wheelchair would need to pass behind the first. If provisions are to be made for this occurrence, the clear width between guardrails would increase to 84".

Based on the above noted standard, walking surfaces on accessible routes that contain slopes steeper than 1 vertical unit in 20 horizontal units are considered ramps. The maximum rise of any ramp run is 30". There must be a landing at the top and bottom of all ramp runs. The slope of a ramp may not exceed 1 vertical unit in 12 horizontal units. The cross slope of ramp runs may not exceed 1 vertical unit in 48 horizontal units. Ramps with a rise of more than 6" must be provided with handrails. One objective of this project is to minimize the need for handrails by limiting slopes to values less than those considered as ramps.

Based on the anthropometric data presented in the "Architectural Graphic Standards" by Ramsey and Sleeper, the eye level for 97.5% of the elderly female adults is at or above 46.1" above the supporting surface when sitting in a wheelchair with a seat height of 19". The eyesight level of adult males is higher for the same statistical grouping when situated similarly. The eyesight level of children seated in wheelchairs vary widely, depending on the child's age.

C. Safety

Guardrails are required on both sides of the bridges to prevent falls. Based on the American Association of State Highway Transportation Officials "Standard Specifications for Highway

Bridges", the height of the guardrail is determined by the intended use of the bridge. If traffic is limited to walking traffic, the guardrail height must be a minimum of 42" above the walking surface. If bicycle traffic is allowed, the guardrail height is increased to a minimum of 54" above the riding surface. The Michigan Building Code 2000 requires guardrails on all sides of elevated platforms, etc. greater than 30" above the adjacent ground surface to prevent falls.

D. Aesthetics

Due to the natural setting of this project, aesthetic considerations for any modifications/improvements are important. It is highly desired to make any new structures fit into the surrounding environment, enhancing the total experience of all viewers rather than detracting from the organic surroundings.

E. Maintenance

Long-term maintenance of all new structures is an important consideration for this project. Degradation due to natural forces and those associated with the human utilization of these structures must be considered. Based on prior experience at numerous other locations, degradation due to humans is expected and the structural components that are most highly at risk due to such activity should be easily repaired or replaced and/or provided with sufficient sacrificial material that maintenance intervals are extended.

F. Loads

The design of the bridges must consider numerous loads to adequately meet their intended usage. Based on the American Association of State Highway Transportation Officials "Guide Specifications for Design of Pedestrian Bridges" the design live load should be 85 pounds per square foot (psf) applied to the walking surface of the bridges. If maintenance and/or emergency vehicles are anticipated, these should be considered in the design. The bridges should be designed to resist lateral wind loads applied to the vertical projected area of the bridge with a magnitude of 75 psf for trusses and arches or 50 psf for girders and beams. The live load deflection of the bridges should be limited to less than $\text{span}/500$. The horizontal deflection due to lateral wind loads should be limited to less than $\text{span}/500$. The natural frequency of the unloaded bridges should be limited to greater than 3 hertz if walking pedestrians are expected. If the design is to account for running or jumping pedestrians, the natural frequency of the unloaded bridges should be increased to greater than 5 hertz. The guardrails on both sides of the bridges should be designed for a load of 50 pounds per linear foot applied horizontally and vertically. This load requirement would also be used to design the posts supporting the railing system.

III. BRIDGE DESIGN ALTERNATIVES

A. Superstructure Framing System

1. Glued Laminated Timber Stringer Bridge

Bridges meeting the objectives of this project could be constructed with glued laminated timber stringers. The material used in the construction of the stringers would be preservatively treated to resist the natural decay process. The stringers could be fabricated with a camber to offset the gravity induced deflections due to the self-weight of the bridge and a percentage of the live load. Alternatively, the stringers could be fabricated with a more exaggerated camber resembling a flat arch. The degree of curvature should be limited such that the slope of the walking surface doesn't exceed the slope limitation, whereby it would be classified as a ramped surface.

2. Weathering Steel Stringer Bridge

The bridges considered in this project could also be fabricated utilizing weathering steel stringers. Weathering steels oxidize similar to common carbon steels. However, the oxidation produced bonds very tightly to the member and forms a barrier that resists further oxidation. This type of steel is commonly used for highway bridges and other exposed structures. As with the laminated timber stringer option above, the steel stringers could be fabricated with a slight camber to offset the deflection due to the dead load and a percentage of the live load or they could be fabricated with a camber approaching a flat arch profile.

3. Prefabricated Steel Through Truss Bridge

Another viable option is a prefabricated truss bridge. Often these are fabricated utilizing steel hollow structural sections, such as tubes, and other light framing members such as angles. A through truss configuration is often utilized such that the two trusses supporting the bridge are also incorporated into the guardrail system on each side of the bridge. Unless fabricated from a weathering steel, as discussed above, these structures are painted to resist corrosion. Maintenance of the paint system, to ensure a long-lived structure, may be more critical than the above noted options, if the incidence of vandalism is as great as expected. See Appendix C for vendor information.

4. Cable Stayed Bridge

Other options that may be considered would include a cable stayed option for the structure. Towers would support cables spanning the river(s). A walking surface equipped with guardrails would then be suspended from these cables. The towers could be constructed utilizing pressure treated wood poles or from weathering or painted steel sections. A rustic appearance, appropriate to the site, would be more easily achieved with the timber pole tower structure supporting a deck and guardrail system fabricated utilizing wood members. Due to the fact that this type of structure is relatively light, additional engineering effort may be required to design a structure that adequately meets the vibrational perception threshold of most people. Typically, cable stayed structures become an economical alternative for long span (>150') applications.

B. Abutments

1. Concrete

The abutments at both ends of both bridges could be constructed utilizing reinforced concrete. This type of construction would be very durable and a long life could be expected. It is anticipated that concrete deliveries would have access to the newly created parking lot and then the concrete would need to be either pumped or transported in buggies to the construction site at the river. Alternatively, site mixed concrete may be an option. The exposed faces of the abutments could be veneered with cultured stone to closely resemble the native river rock present at the site. Alternatively, the exposed faces could be textured by form inserts and the concrete could be stained in an attempt to match the native stone. The success of achieving a close match to the native stone utilizing the latter method may be highly variable between different contractors.

2. Masonry

Similar to the concrete option discussed above, the abutment walls could be constructed utilizing reinforced masonry grouted solid. Typically, masonry walls would be founded on a footing of reinforced concrete. Though slightly less durable than concrete, a long life would be anticipated. Site mixed concrete, grout and mortar would be expected for this alternative. As discussed above, a veneered culture stone face could be provided at all exposed surfaces to match the native stone found in the area.

3. Timber Crib

The existing bridges are founded on stone filled timber cribs and this option would also be feasible for the new structures. Extensive measures may be required to make this type of foundation flood resistant. This may involve increasing the bridge spans such that the cribs are located beyond the anticipated flood elevation or by anchoring them to bedrock with rock bolts.

C. Guardrail System

1. Horizontal Wood Rails

The guardrail system of the bridges could be designed with wood members oriented horizontally. These members would then be supported at intervals by posts to transfer the rail loads to the bridge structure. If wood stringers are used, the posts would most likely be fabricated from wood. If the bridge stringers are fabricated from steel, the posts could be either wood or steel matching the stringer construction. The AASHTO "Standard Specifications for Highway Bridges" specify that the maximum clear opening between rail members shall not allow a 6" diameter sphere to pass within the lower 27" of the guardrail system. Between 27" and the top rail an 8" diameter sphere shall not pass between rails. To resist the natural decay process, the guardrail system should be fabricated from a decay resistant species of wood or from material that has been preservatively treated. See Appendix D for sample photographs of horizontal wood guardrails.

2. Vertical Wood Stiles

The guardrail system of the bridges could be designed with the members oriented vertically. Typically, these members would then be supported by horizontal members top and bottom, spanning to posts similar to the above system. For this arrangement all vertical members should be spaced to meet the 6" diameter sphere requirement described above. As noted above, the guardrail system should be fabricated from naturally decay resistant material or from material that has been treated to resist decay. See Appendix D for sample photographs of vertical stile guardrails.

3. Steel/Aluminum Pipe

A functional rail system could be fabricated from either steel or aluminum pipe similar to numerous commercial and bridge applications. Though functionally adequate, this type of rail system may not be as aesthetically pleasing as other possible options. Therefore, the pipe railing option may not be as appropriate for this project as a wood railing. Also as noted above, a painted steel system may require more maintenance to prevent corrosion.

4. Probable Cost Summary

We generated an opinion of the probable construction cost based on a number of alternative bridge designs for the proposed project. We have assumed that the mobilization, sitework and foundation costs would be approximately equal for all of the various bridge designs. Additionally, we based our probable cost opinion on the assumption of a grouted masonry abutment wall system founded on a cast-in-place concrete footing. The table below summarizes the results of our cost estimates. See Appendix A for a complete listing of each option.

<u>Structure Type</u>	<u>5'x60'</u>	<u>5'x80'</u>	<u>7'x60'</u>	<u>7'x80'</u>
Glued Laminated Timber Stringer Bridge	\$93,261.44	\$115,858.94	\$96,538.94	\$116,721.44
Weathering Steel Stringer Bridge	\$103,611.44	\$133,108.94	\$111,373.94	\$144,321.44
Prefabricated Weathering Steel Truss Bridge - Vendor A	-	-	\$102,748.94	\$125,173.94
Prefabricated Painted Steel Truss Bridge - Vendor A	-	-	\$109,648.94	\$136,098.94
Prefabricated Weathering Steel Truss Bridge - Vendor B	-	-	\$103,878.24	\$122,365.64

IV. CONCLUSIONS AND RECOMMENDATIONS

1. To provide accessibility with a minimum of inconvenience while observing the falls, we recommend that the bridge width be a minimum of 84" between rails. This is the minimum width that would permit passage of a second wheelchair-bound person if one was already viewing, photographing, etc. the falls from a position on the bridge with an orientation perpendicular to the bridge span. Though slightly more expensive than a 60" width, we believe that it would be a better solution toward achieving the goals of this project.
2. We recommend that bicycle (and snowmobile) traffic be prohibited from utilizing the trail/bridge system. This would allow the use of a 42" guardrail top rail height, maximizing the quality of the viewing opportunities for most adult people in wheelchairs by allowing them to view the falls over the top of the rail while crossing the bridges.
3. We recommend the use of a vertical stile type of guardrail system to provide good viewing opportunities to a majority of children in wheelchairs while crossing the bridges. A horizontal rail system may make viewing difficult for personnel within certain height groups. Additionally, a vertical stile system is less climbable, and therefore a safer option, in our opinion.
4. To meet the aesthetic goals of this project, we recommend that a glued laminated timber stringer bridge with a wood deck and guardrail system be considered for this project. Based on our preliminary conceptual phase estimates of the probable construction cost (see Appendix A), we believe that the laminated timber stringer option will be somewhat more economical. We recommend that the stringers be cambered to an amount equivalent to the anticipated combined dead and live load deflection. Alternatively, the stringers could be fabricated with a flat arch profile, if desired, to fulfil the aesthetic requirements of this project.
5. We recommend that the laminated stringers be pressure treated with pentachlorophenol in type A solvent applied in an empty cell process to a retention of 0.6 pounds per cubic foot (pcf). We recommend that the decking be preservatively treated with CCA to a retention of 0.6 pcf. We recommend that the post and guardrail system be fabricated from naturally decay resistant material (western red cedar heartwood) to minimize the public's concern about chemical contamination by contacting the guardrails.
6. Due to the remote location of the site, we recommend that solid grouted reinforced masonry abutments be considered for this project. To enhance the aesthetic quality of these abutments, we recommend that the highly visible portions be faced with a veneer of cultured stone closely matching the natural material at the site. If a local source of natural stone is available, matching that at the site, it could also be considered as facing material. To meet the flood resistant requirements of this project, we recommend that the abutments be founded on concrete footings doweled to the natural bedrock if found at a reasonable depth. Alternatively, we recommend that the scour potential around these foundations be minimized with the application of riprap, similar to the native stone if available.
7. The existing 62' span bridge is currently in poor condition. Therefore, we recommend that

this bridge not be utilized by the contractor during construction. The contractor will need to provide a temporary means of crossing this side of the river during construction. If the existing 62' bridge is removed prior to construction, the replacement bridge at this side of the river can be located and oriented similar to the existing bridge. We recommend that the existing 84' bridge structures be left in place during the construction period for use by the contractor. Therefore, we recommend that the new 84' bridge be offset sufficiently from the existing bridge structure to allow construction prior to the removal of the existing bridge and foundations.

8. If the new bridges are constructed in the same location as the existing bridges, the bridge spans would be approximately 62' and 84' to allow the abutment construction to occur at the 98.4' elevation of the 100 year stream flow (see item 9 below). If the eastern bridge is located downstream from its current position its length will remain approximately equal to its current value.
9. Based on our hydraulic analysis, the 100 year flow elevation is approximately 98.4' at the existing bridge centerline. The new bridge superstructures must be placed above this elevation. Based on our preliminary structural design, we anticipate the depth of the 84' span bridge structure to be approximately 4'-3" based on a glued laminated timber stringer bridge with a 7'-0" clear width walking surface. Therefore, we recommend the elevation of the walking surface for this bridge be placed at or above elevation 103.0'. Similarly, we estimate the depth of the 62' span bridge structure to be approximately 3'-3". Therefore, we recommend the walking surface of the 62' span be placed at or above elevation 102.0'. The structure depths may increase slightly if the span lengths are increased, thereby requiring a revision to the above noted elevations. Additionally, the estimated costs of the bridges may increase slightly if their lengths are increased above the 60' and 80' lengths that we used in our cost analysis.
10. Based on the 100 year flow elevation noted above and the DEQ requirement that the viewing platform framing be located above this elevation, we anticipate that the elevation for the walking surface will be at or above elevation 99.5'. If the viewing platforms are constructed at this elevation we anticipate that stairs and ramps with hand/guardrails will be required to accommodate the elevation difference between the platforms and the bridges. These ramps and stairs could be located such that they do not interfere with the viewing of the falls. Alternatively, if the platform elevations are raised to closely match those of the proposed bridges, guardrails will be required at all sides where the platform is more than 30" above the adjacent grade to prevent falls. One option may be to move the platforms away from the river's edge sufficiently to allow site grading (filling) above the 100 year flow elevation such that the difference between the grade elevation and the platform walking surface is less than 30". This would allow construction of the viewing platforms without the need to provide guardrails. We recommend that the bridge design progress along with the viewing platform design so that both fit the site, in the desired manner.

APPENDIX A

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 06, 2002

Pedestrian Bridge at Bond Falls State Park
5' Wide x 60' Span Timber Stringer Bridge

Prepared By:
June 06, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, pressure treated glued laminated timber stringers, pressure
treated wood deck, cedar post and railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
7070013	Structural Steel, Mixed, Furn and Fab	1,000	Lb	2.50	2,500.00
7070014	Structural Steel, Mixed, Erect	1,000	Lb	0.50	500.00
7090001	Structure, Timber	1	LS	18,000.00	18,000.00
7090003	Timber and Lumber, Treated, Furn and Place	1.5	MBF	2,500.00	3,750.00
7090004	Hardware, Misc	500	Lb	2.00	1,000.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$81,096.90

Contingencies & Eng.

@(15%) = **12,164.53**

Total Estimated Cost = \$93,261.44

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 06, 2002

Pedestrian Bridge at Bond Falls State Park
5' Wide x 80' Span Timber Stringer Bridge

Prepared By:
June 06, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations, excavation for construction of new foundations, grouted reinforced masonry abutments, pressure treated glued laminated timber stringers, pressure treated wood deck, cedar post and railing system, backfill mulch and seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
7070013	Structural Steel, Mixed, Furn and Fab	1,000	Lb	2.50	2,500.00
7070014	Structural Steel, Mixed, Erect	1,000	Lb	0.50	500.00
7090001	Structure, Timber	1	LS	36,000.00	36,000.00
7090003	Timber and Lumber, Treated, Furn and Place	2.0	MBF	2,500.00	5,000.00
7090004	Hardware, Misc	700	Lb	2.00	1,400.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$100,746.90

Contingencies & Eng.

@(15%) = **15,112.04**

Total Estimated Cost = \$115,858.94

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 18, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 60' Span Timber Stringer Bridge

Prepared By:
June 18, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations, excavation for construction of new foundations, grouted reinforced masonry abutments, pressure treated glued laminated timber stringers, pressure treated wood deck, cedar post and railing system, backfill mulch and seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
7070013	Structural Steel, Mixed, Furn and Fab	1,000	Lb	2.50	2,500.00
7070014	Structural Steel, Mixed, Erect	1,000	Lb	0.50	500.00
7090001	Structure, Timber	1	LS	20,100.00	20,100.00
7090003	Timber and Lumber, Treated, Furn and Place	1.8	MBF	2,500.00	4,500.00
7090004	Hardware, Misc	500	Lb	2.00	1,000.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, C I A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$83,946.90

Contingencies & Eng.

@(15%) = **12,592.03**

Total Estimated Cost = \$96,538.94

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 18, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 80' Span Timber Stringer Bridge

Prepared By:
June 18, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations, excavation for construction of new foundations, grouted reinforced masonry abutments, pressure treated glued laminated timber stringers, pressure treated wood deck, cedar post and railing system, backfill mulch and seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
7070013	Structural Steel, Mixed, Furn and Fab	1,000	Lb	2.50	2,500.00
7070014	Structural Steel, Mixed, Erect	1,000	Lb	0.50	500.00
7090001	Structure, Timber	1	LS	36,000.00	36,000.00
7090003	Timber and Lumber, Treated, Furn and Place	2.3	MBF	2,500.00	5,750.00
7090004	Hardware, Misc	700	Lb	2.00	1,400.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$101,496.90

Contingencies & Eng.

@(15%) = **15,224.54**

Total Estimated Cost = \$116,721.44

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 06, 2002

Pedestrian Bridge at Bond Falls State Park
5' Wide x 60' Span Steel Stringer Bridge

Prepared By:
June 06, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, unpainted weathering steel stringers, pressure
treated wood deck, steel post and cedar railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
7070013	Structural Steel, Mixed, Furn and Fab	10,000	Lb	2.50	25,000.00
7070014	Structural Steel, Mixed, Erect	10,000	Lb	0.50	5,000.00
7090003	Timber and Lumber, Treated, Furn and Place	1.5	MBF	2,500.00	3,750.00
7090004	Hardware, Misc	500	Lb	2.00	1,000.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$90,096.90

Contingencies & Eng.

@(15%) = 13,514.54

Total Estimated Cost = \$103,611.44

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 06, 2002

Pedestrian Bridge at Bond Falls State Park
5' Wide x 80' Span Steel Stringer Bridge

Prepared By:
June 06, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, unpainted weathering steel stringers, pressure
treated wood deck, steel post and cedar railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
7070013	Structural Steel, Mixed, Furn and Fab	18,000	Lb	2.50	45,000.00
7070014	Structural Steel, Mixed, Erect	18,000	Lb	0.50	9,000.00
7090003	Timber and Lumber, Treated, Furn and Place	2.0	MBF	2,500.00	5,000.00
7090004	Hardware, Misc	700	Lb	2.00	1,400.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$115,746.90

Contingencies & Eng.

@(15%) = 17,362.04

Total Estimated Cost = \$133,108.94

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 18, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 60' Span Steel Stringer Bridge

Prepared By:
June 18, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, unpainted weathering steel stringers, pressure
treated wood deck, steel post and cedar railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
7070013	Structural Steel, Mixed, Furn and Fab	12,000	Lb	2.50	30,000.00
7070014	Structural Steel, Mixed, Erect	12,000	Lb	0.50	6,000.00
7090003	Timber and Lumber, Treated, Furn and Place	1.8	MBF	2,500.00	4,500.00
7090004	Hardware, Misc	500	Lb	2.00	1,000.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$96,846.90

Contingencies & Eng.

@(15%) = **14,527.04**

Total Estimated Cost = \$111,373.94

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 18, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 80' Span Steel Stringer Bridge

Prepared By:
June 18, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, unpainted weathering steel stringers, pressure
treated wood deck, steel post and cedar railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
7070013	Structural Steel, Mixed, Furn and Fab	21,000	Lb	2.50	52,500.00
7070014	Structural Steel, Mixed, Erect	21,000	Lb	0.50	10,500.00
7090003	Timber and Lumber, Treated, Furn and Place	2.3	MBF	2,500.00	5,750.00
7090004	Hardware, Misc	700	Lb	2.00	1,400.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = **\$125,496.90**

Contingencies & Eng.

@ (15%) = **18,824.54**

Total Estimated Cost = **\$144,321.44**

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 21, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 60' Span Prefabricated Weathering Steel Truss Bridge - Vendor A

Prepared By:
June 21, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes: Remove existing timber pole stringer bridge incl. foundations, excavation for construction of new foundations, grouted reinforced masonry abutments, prefabricated weathering steel thru-truss, complete with deck and railing system, backfill mulch and seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
	Prefabricated Bridge incl. deck and guardrails	1	LS	25,000.00	25,000.00
7070014	Structural Steel, Mixed, Erect	18,000	Lb	0.50	9,000.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract =	\$89,346.90
Contingencies & Eng.	
@ (15%) =	13,402.04

Total Estimated Cost = \$102,748.94

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 21, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 80' Span Prefabricated Weathering Steel Truss Bridge - Vendor A

Prepared By:
June 21, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, prefabricated weathering steel thru-truss, complete with
deck and railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
	Prefabricated Bridge incl. deck and guardrails	1	LS	40,000.00	40,000.00
7070014	Structural Steel, Mixed, Erect	27,000	Lb	0.50	13,500.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$108,846.90

Contingencies & Eng.

@(15%) = **16,327.04**

Total Estimated Cost = \$125,173.94

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 21, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 60' Span Prefabricated Painted Steel Truss Bridge - Vendor A

Prepared By:
June 21, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, prefabricated painted steel thru-truss, complete with
deck and railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
	Prefabricated Bridge incl. deck and guardrails	1	LS	30,000.00	30,000.00
7070014	Structural Steel, Mixed, Erect	20,000	Lb	0.50	10,000.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$95,346.90

Contingencies & Eng.

@(15%) = **14,302.04**

Total Estimated Cost = \$109,648.94

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 21, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 80' Span Prefabricated Painted Steel Truss Bridge - Vendor A

Prepared By:
June 21, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, prefabricated painted steel thru-truss, complete with
deck and railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
	Prefabricated Bridge incl. deck and guardrails	1	LS	48,000.00	48,000.00
7070014	Structural Steel, Mixed, Erect	30,000	Lb	0.50	15,000.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$118,346.90

Contingencies & Eng.

@(15%) = 17,752.04

Total Estimated Cost = \$136,098.94

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 24, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 60' Span Prefabricated Steel Stringer Bridge - Vendor B

Prepared By:
June 24, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, prefabricated painted steel truss, complete with
deck and railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
	Prefabricated Bridge incl. deck and guardrails	1	LS	25,982.00	25,982.00
7070014	Structural Steel, Mixed, Erect	18,000	Lb	0.50	9,000.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$90,328.90

Contingencies & Eng.

@(15%) = **13,549.34**

Total Estimated Cost = \$103,878.24

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Conceptual Estimate
June 24, 2002

Pedestrian Bridge at Bond Falls State Park
7' Wide x 80' Span Prefabricated Steel Stringer Bridge - Vendor B

Prepared By:
June 24, 2002

Jim Rintala, PE
Northwest Design Group, Inc.
Petoskey, Michigan

This Estimate Includes:

Remove existing timber pole stringer bridge incl. foundations,
excavation for construction of new foundations, grouted reinforced masonry
abutments, prefabricated painted steel truss, complete with
deck and railing system, backfill mulch and
seeding of embankments, heavy riprap and other erosion control items.

PAY ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
1000001	Mobilization	1	LS	\$5,000.00	\$5,000.00
1040002	Contractor Staking for Bridges	1	LS	2,000.00	2,000.00
2040020	Structures, Rem	1	LS	4,000.00	4,000.00
2050011	Embankment, CIP	50	CY	10.00	500.00
2050015	Excavation, Earth	50	CY	5.00	250.00
2060002	Backfill, Structure, CIP	70	CY	6.25	437.50
2060011	Excavation, Fnd	70	CY	12.50	875.00
2060012	Excavation, Rock Fnd	11	CY	560.00	6,160.00
2080011	Erosion Control, Filter Bag	2	Ea	500.00	1,000.00
2080025	Erosion Control, Silt Fence	400	LF	1.25	500.00
3060001	Aggregate, Surface Cse	10	CY	16.00	160.00
7040007	Cofferdams	1	LS	4,000.00	4,000.00
7060020	Substructure Conc.	8	CY	500.00	4,000.00
7060030	Reinforcement, Steel	1	Ton	2,000.00	2,000.00
	Prefabricated Bridge incl. deck and guardrails	1	LS	37,658.00	37,658.00
7070014	Structural Steel, Mixed, Erect	26,800	Lb	0.50	13,400.00
7120034	Adhesive Anchoring of Vertical Bar, 19	8	Ea	200.00	1,600.00
8130017	Riprap, Heavy	12	CY	50.00	600.00
	Masonry, 8", Reinforced, Grouted Solid	230	SF	11.22	2,580.60
	Masonry, 12", Reinforced, Grouted Solid	460	SF	14.53	6,683.80
	Reinforcement, Steel	1	Ton	2,500.00	2,500.00
	Masonry, Veneer	440	SF	17.00	7,480.00
8160005	Seeding, Mixture TDS	10	Lb	3.00	30.00
8160020	Fertilizer, Chemical Nutrient, CI A	50	Lb	1.00	50.00
8160034	Topsoil Surface, Furn., Haul and Spread, 3 in.	700	SY	4.00	2,800.00
8160070	Mulch	700	SY	0.20	140.00

Total Estimated Contract = \$106,404.90

Contingencies & Eng.

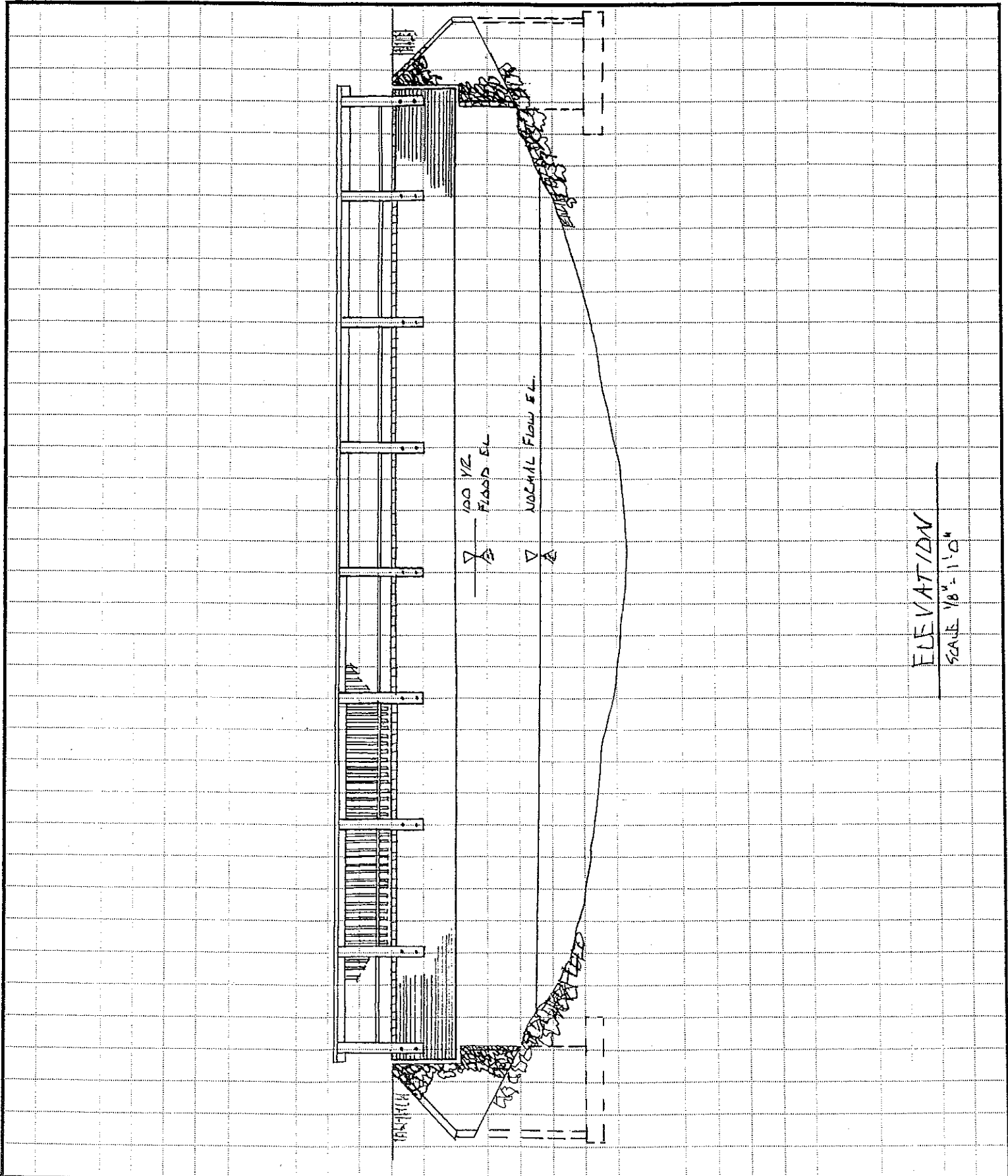
@(15%) = 15,960.74

Total Estimated Cost = \$122,365.64

Note:

Actual construction costs may vary significantly depending upon the timing of construction, market conditions, and other factors beyond our control.

APPENDIX B





Northwest Design Group
CONSULTING ENGINEERS

2940 Parkview Drive, P.O. Box F
Petoskey, Michigan 49770
(V)231.348.1180 (F)231.348.1185

JOB _____

SHEET NO. _____

OF _____

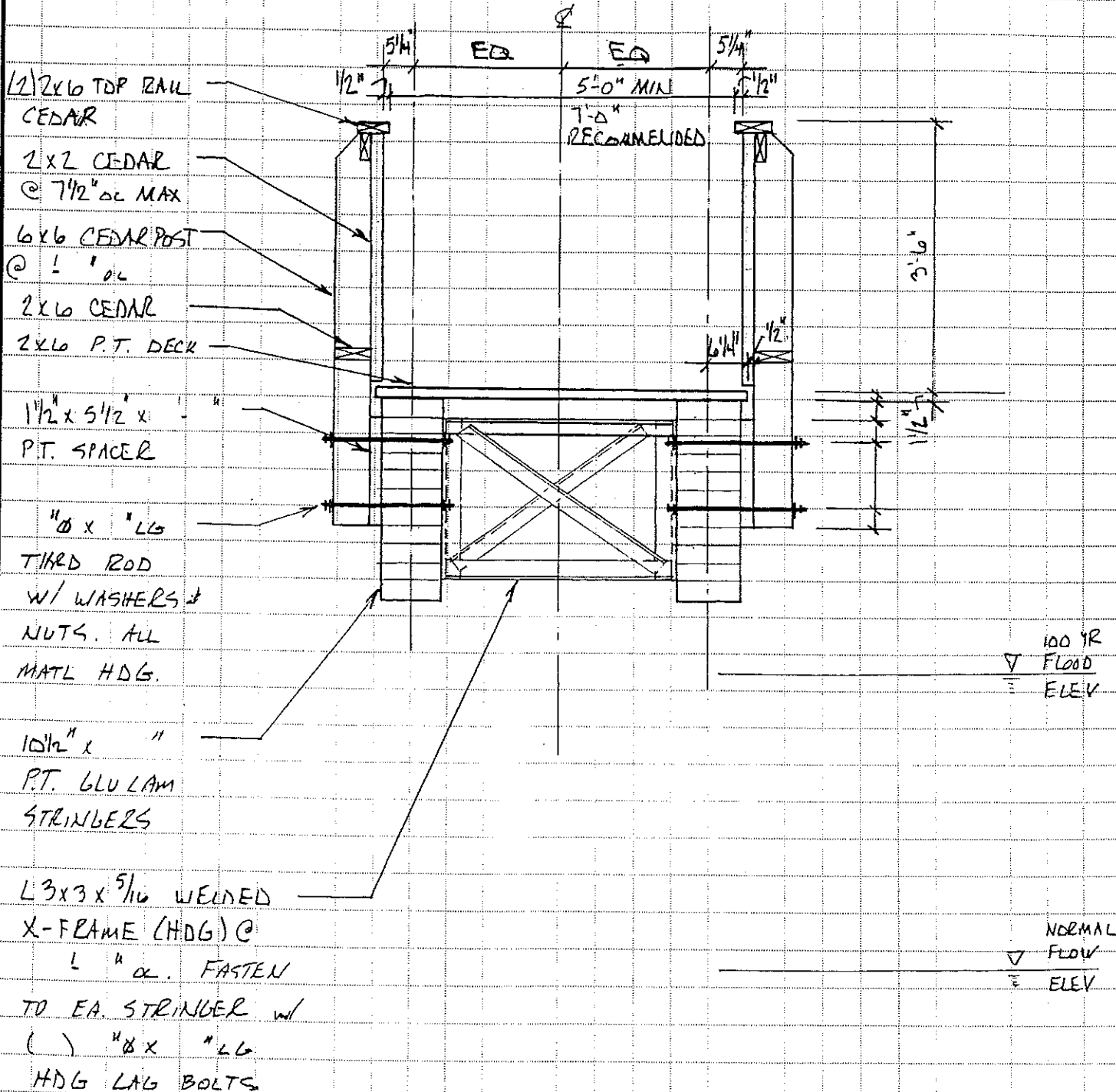
CALCULATED BY _____

DATE _____

CHECKED BY _____

DATE _____

SCALE _____

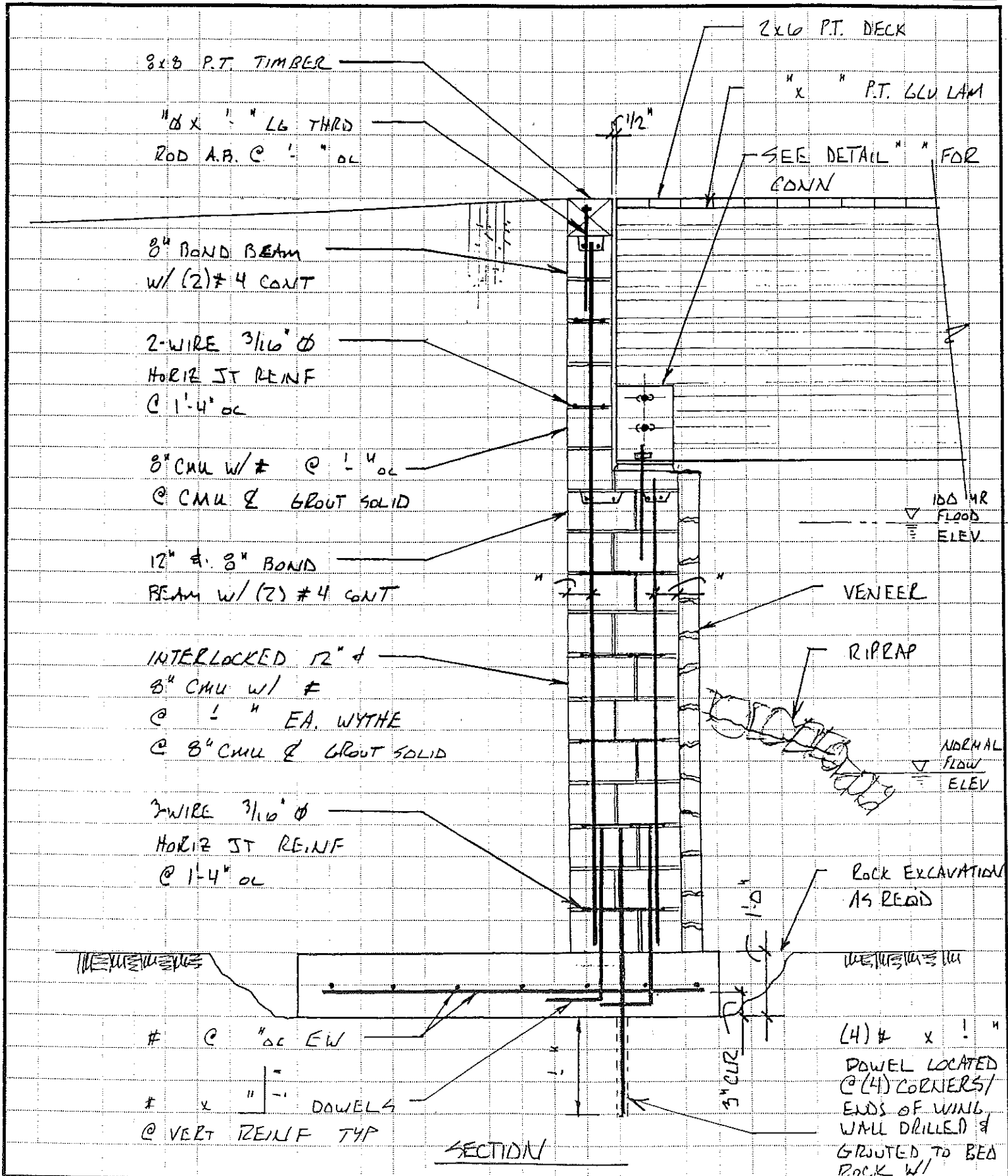




Northwest Design Group
CONSULTING ENGINEERS

2940 Parkview Drive, P.O. Box F
Petoskey, Michigan 49770
(M)231.348.1180 (F)231.348.1185

JOB _____
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____



APPENDIX C



8301 State Hwy 29 N • Alexandria, MN 56308

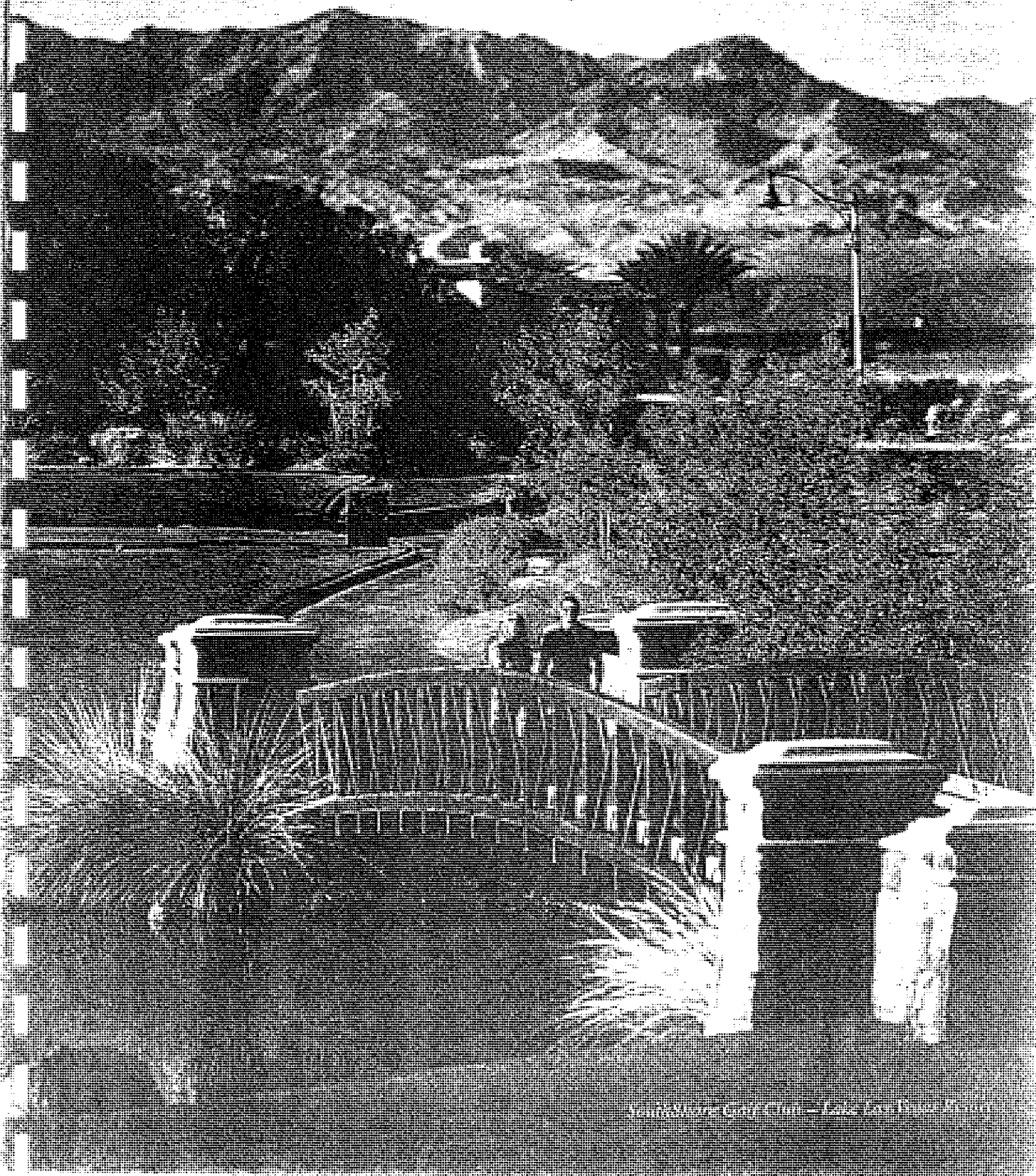
Nat'l: (800) 328-2047
Fax: (320) 852-7067
E-Mail: markb@continentalbridge.com
Web Site: www.continentalbridge.com

Mark Becker
Technical Sales
Direct: (320) 852-5324



CONTINENTAL BRIDGE

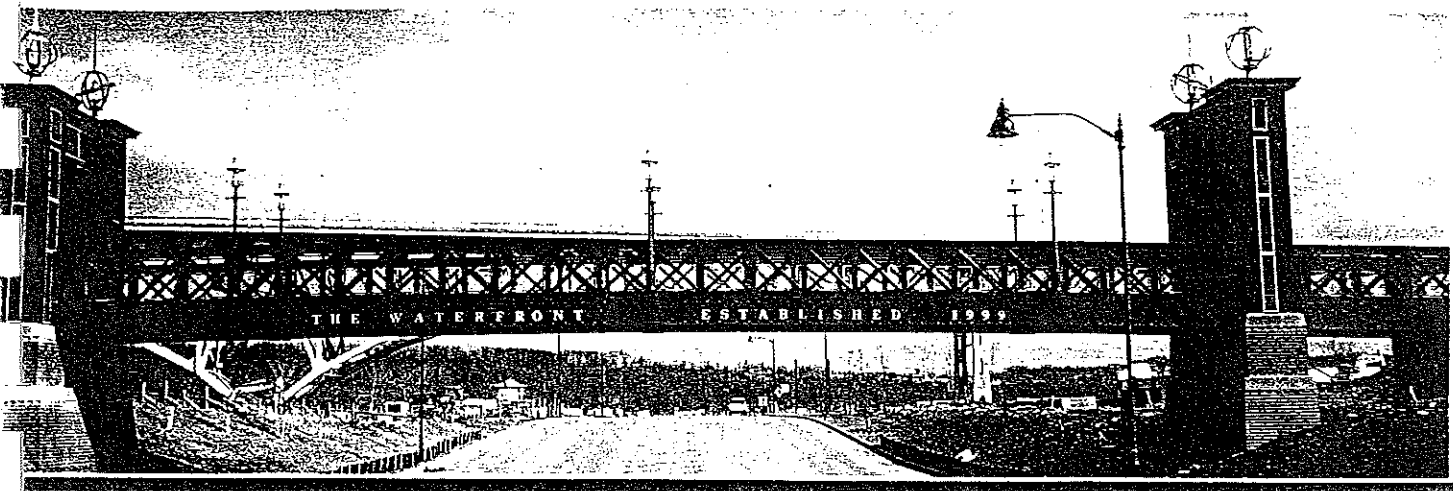
The Information Experts



San Mateo Golf Club - Lake Los Angeles, California

CONTINENTAL BRIDGE...

YOUR BRIDGE INFORMATION EXPERTS



Pittsburgh, PA

You have a project that requires a bridge. You desire in the end, a bridge built with a quality and beauty that exceeds your expectations. There is only one way to achieve that outcome, up front information.

As the industry leader and champion, Continental Bridge can supply you with:

- Photographs of Comparable Projects
- Drawings and Sketches
- Detailed Customized Specifications
- Timely and Accurate Budget Pricing
- Installation, Lifting, and Splicing Instructions
- Maintenance Instructions
- Foundation Interface Details and Reactions

SPRINT-2 Prefabricated Bridge

Reference

This information, provided by the experts at Continental Bridge, gives you the tools to determine that a prefabricated bridge is the correct solution for your project.

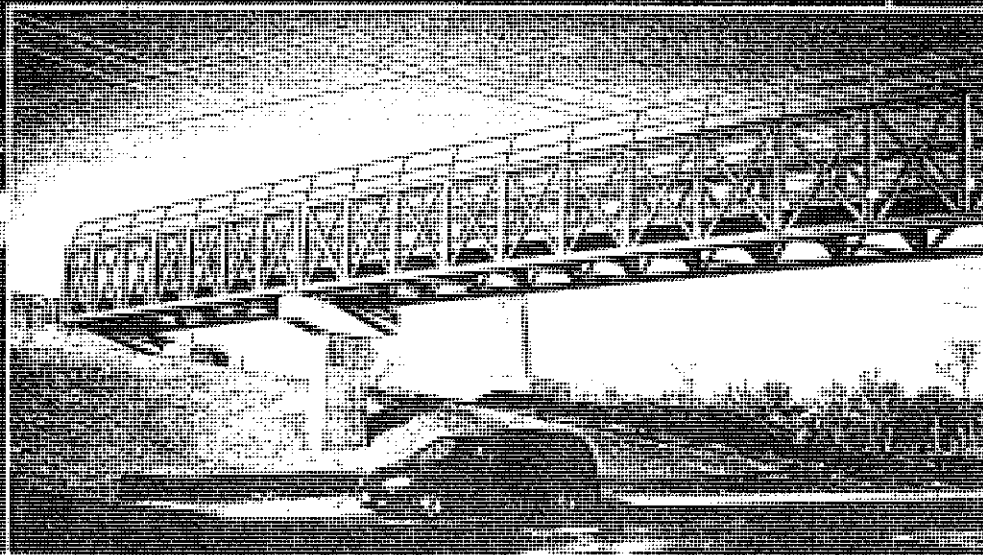
Continental Bridge Delivers...

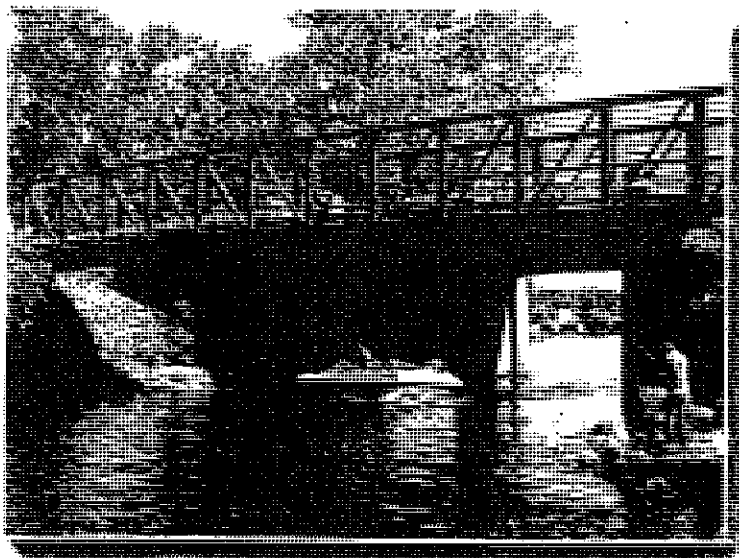
...Answers

...No Surprises

...Superior Service

...Leadership.

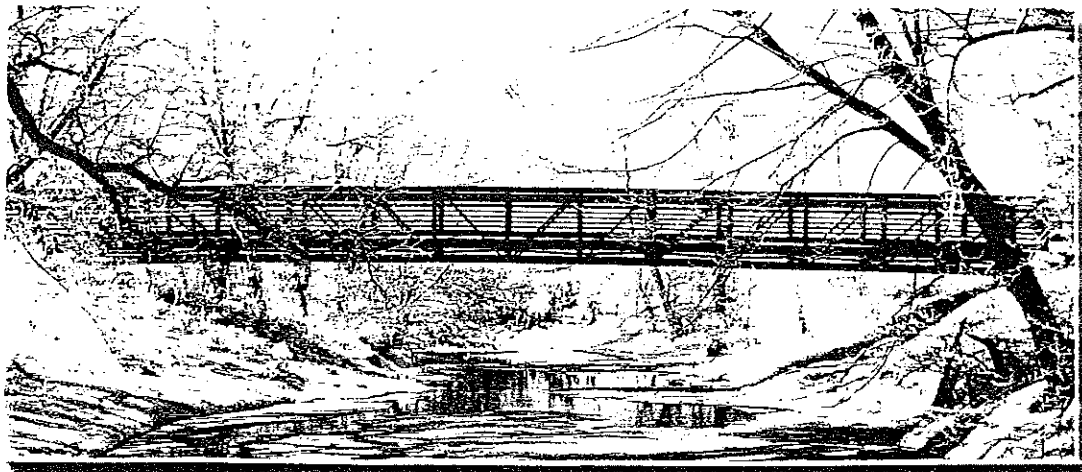




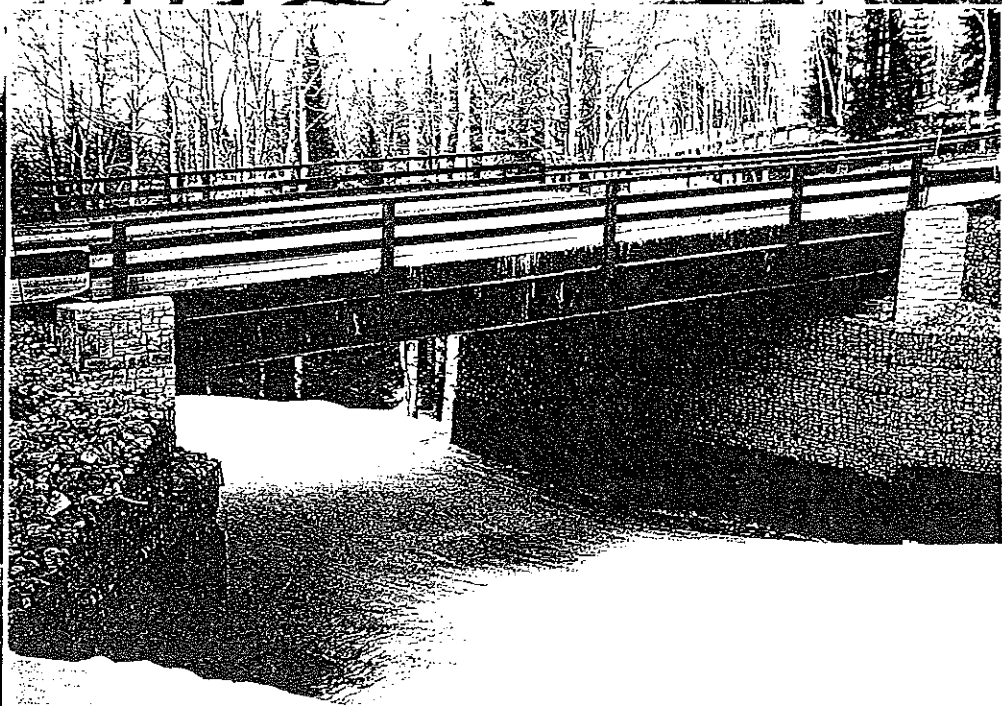
Albany, NY



Minneapolis, MN



Ackley, MN

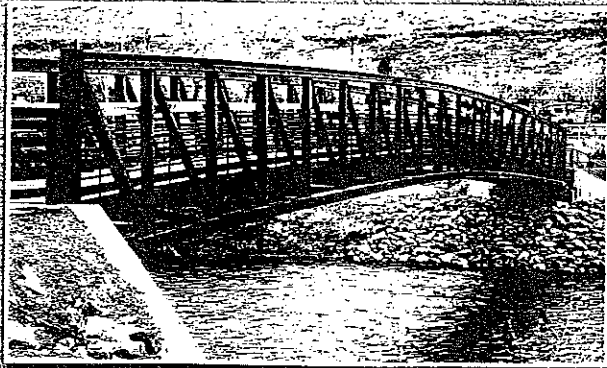


Paulsboro, NJ

System Types:

In maintaining our leadership role, Continental Bridge has developed a set of Bridge System Types to better identify the structural system that should be used for a given bridge. Each type has unique engineering and

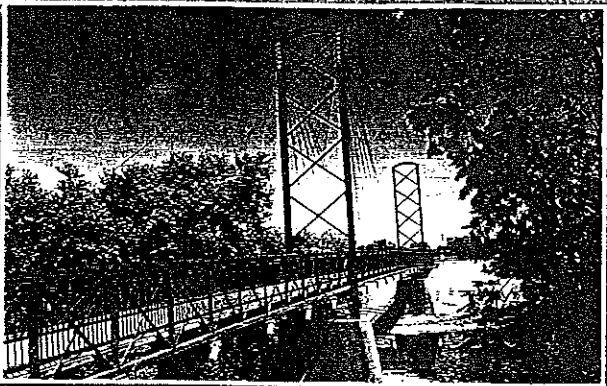
fabrication characteristics, which allow each system to be cost effective within a certain range of span lengths and bridge usage. Please contact a Continental Bridge representative to determine which system is right for your project.



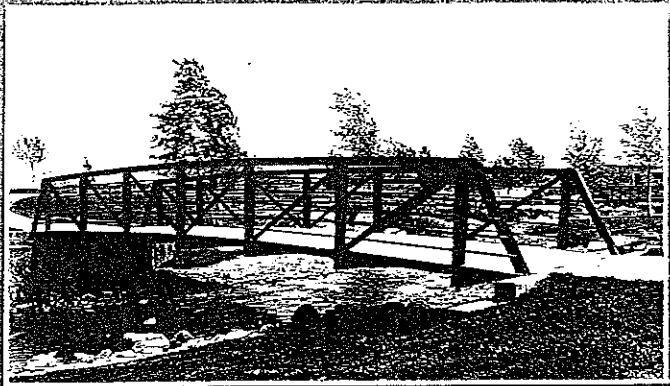
Half-Through H-Section System *Reno, NV*



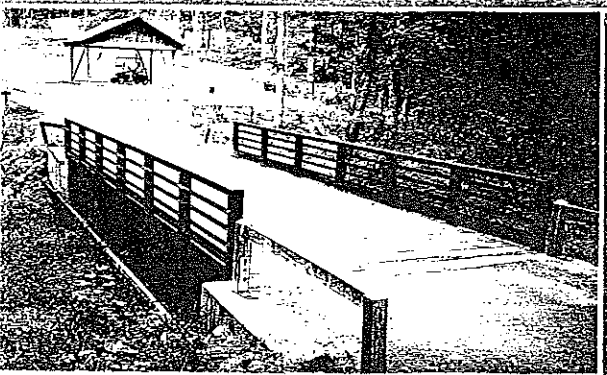
Bowstring System *Cumberland, MD*



Cable-Stayed System *Indianapolis, IN*



Half-Through Pony System *Kenderson, KY*



Stringer System *Triangle, VA*



Hardwood System *Chicago, IL*



8301 State Hwy. 29 N.,
Alexandria, MN 56308

For more technical information
and detailed literature contact us at:

1-800-328-2047

Ph: (320) 852-7500 • Fax: (320) 852-7067

E-mail: conbridg@continentalbridge.com

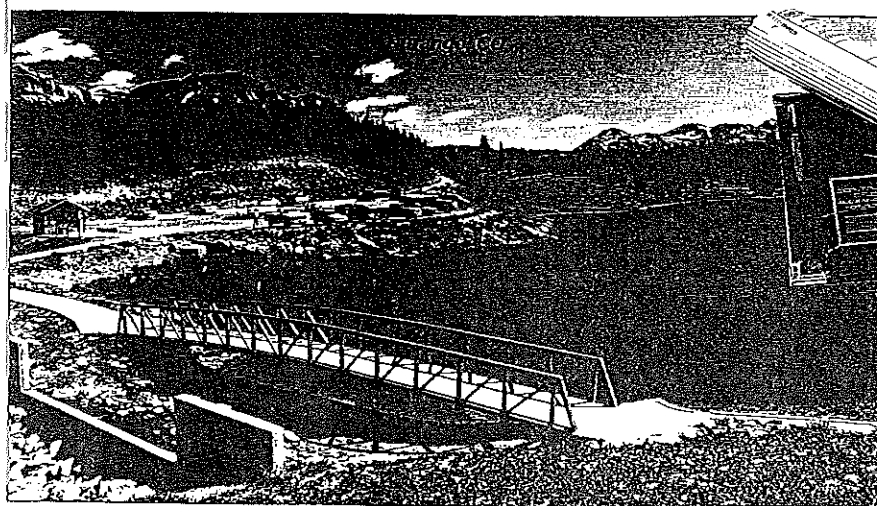
www.continentalbridge.com



Full-Through Box System *Tonka, MI*



Cuyahoga Falls, OH



Recreational Bridges

For design, engineering, and technical bridge information – call the experts... Continental Bridge. Committed to the highest quality customer service, Continental provides

specification
information and
engineering
expertise for
accurate
completion of your
bridge project. Our
bridge solutions are

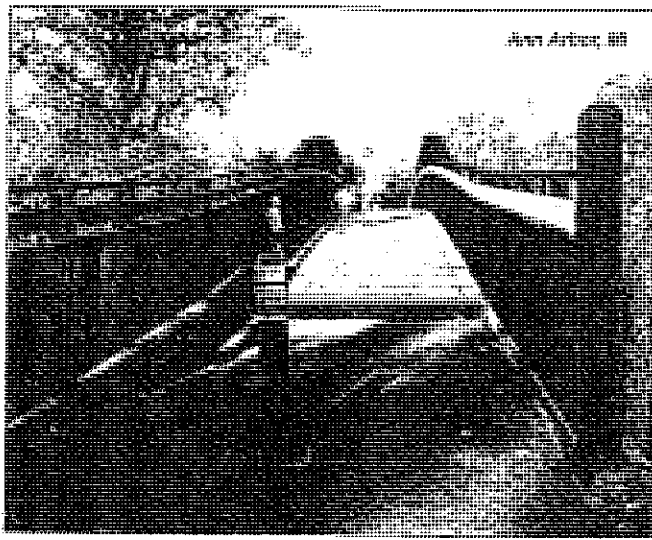
not only functional and low-maintenance, but add beauty to your recreational project. We believe that nothing is beyond our technical capabilities. If you envision it, we can design and build it. That's what you would expect from a leader, that's the way of Continental Bridge.

*Unique solutions
for your unique setting!*

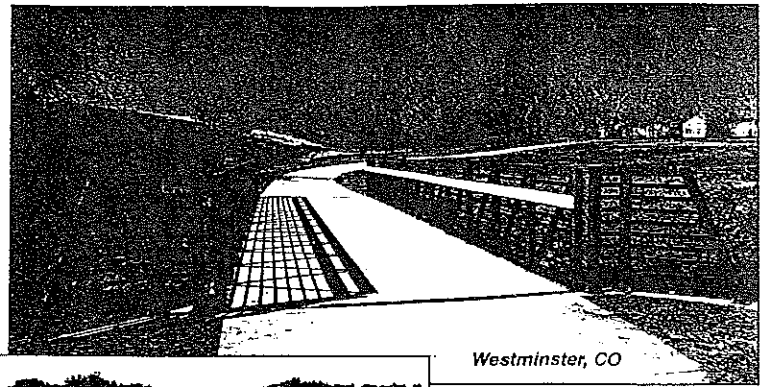


Where Leadership is Expected

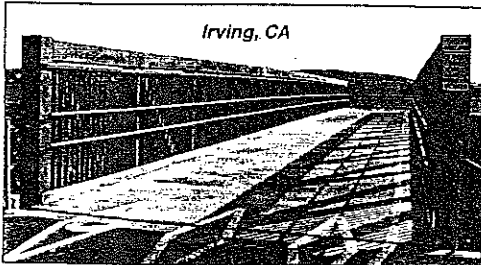
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Call: 800-328-2047



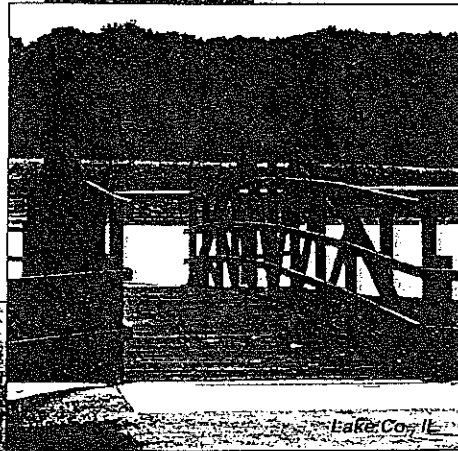
Ann Arbor, MI



Westminster, CO



Irving, CA



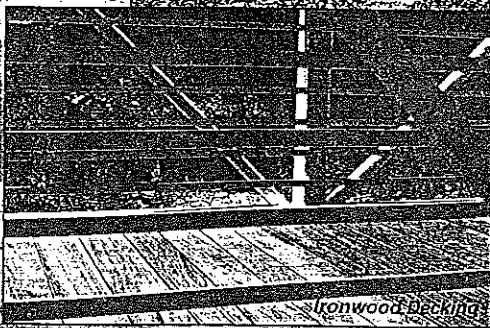
La Jolla, CA



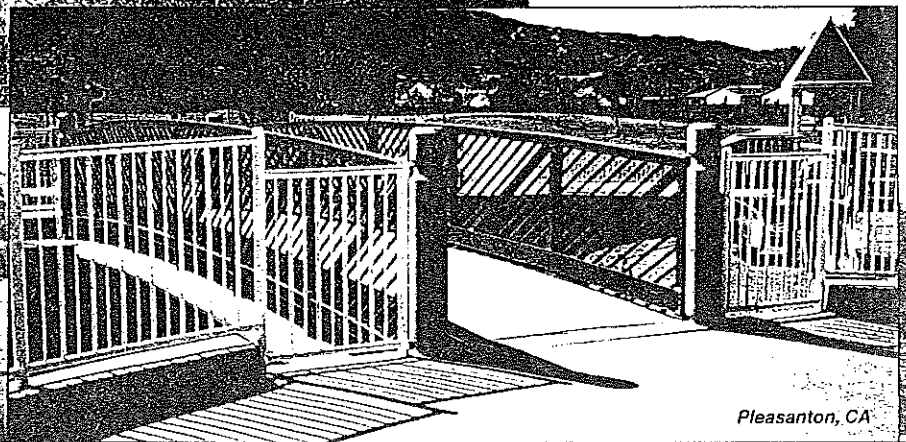
San Antonio, TX

Continental's goal is to surpass the basics and continue to be the market leader in quality, durability, on-time delivery, and competitive pricing. Our bridges are engineered to meet applicable safety codes and handicapped accessibility requirements while keeping in mind your project's architectural features and options.

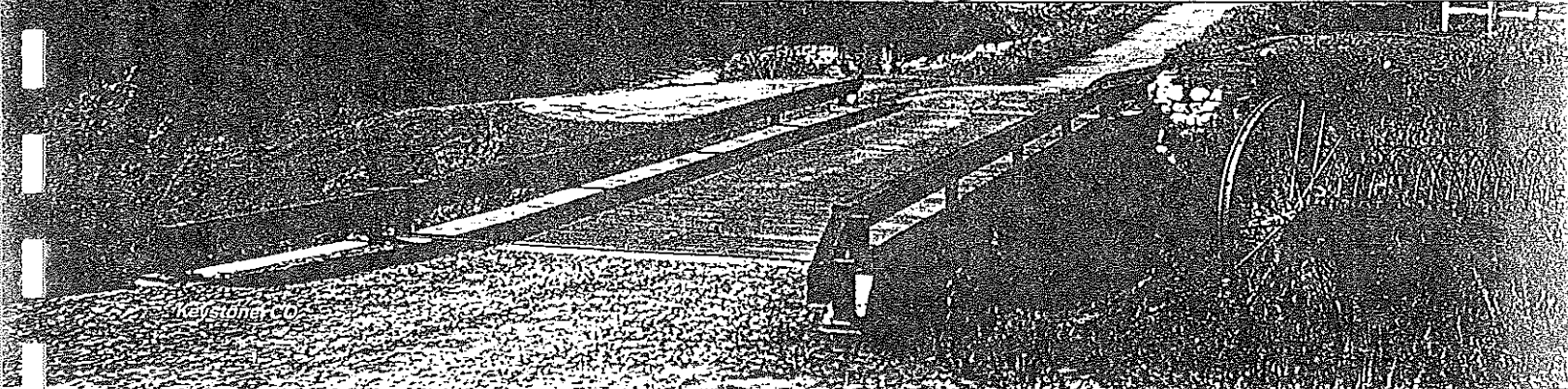
SPECOM™ is Continental's answer to help limit and control a Specifier's liability. This unique document provides the specifier with a detailed narrative covering all aspects of bridge specification, submittal requirements, submittal approval checklists, and final bridge product. Detailed specifications, written with the help of SPECOM™, assure that the product supplied is exactly what was expected.



Ironwood, Becking



Pleasanton, CA



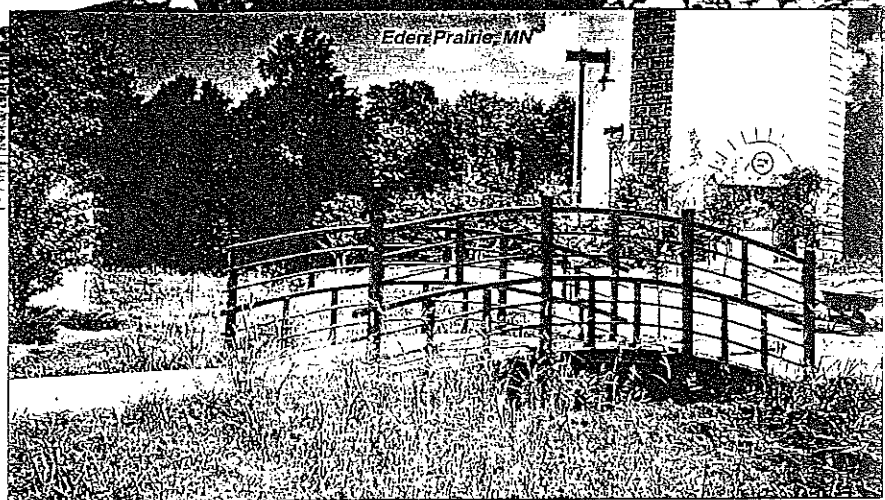
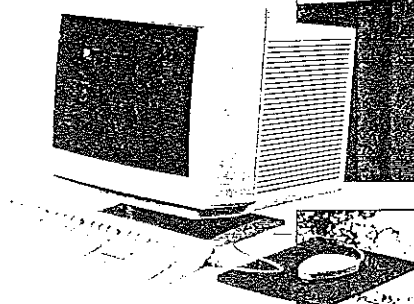
Karlsruhe, CO



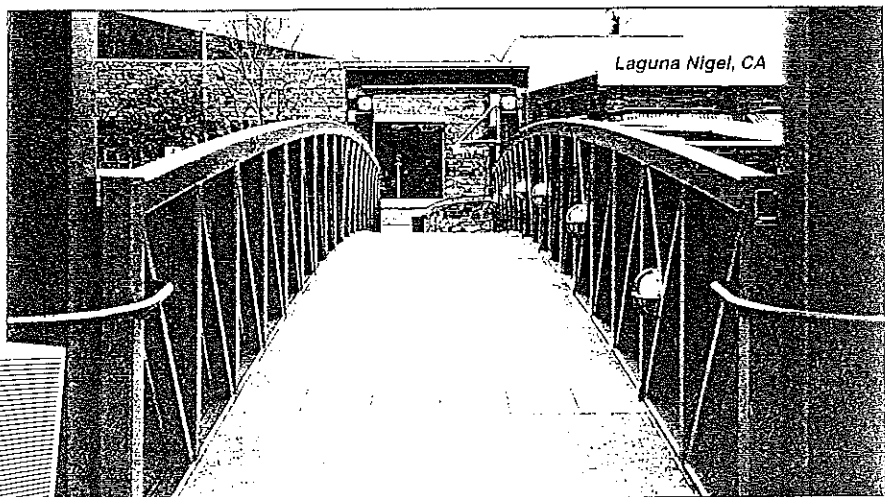
Walt Disney World
Orlando, FL

Specialty Bridges

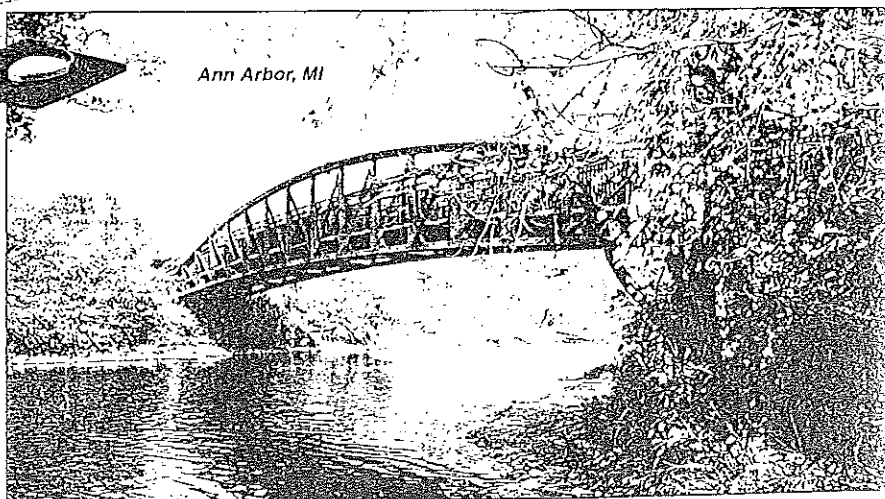
Solving unique and special bridging situations is a distinguished trademark of Continental Bridge. From highly decorative to custom functionality, Continental accomplishes it all. Safety, beauty, functionality, and cost effectiveness are requirements strictly followed by our engineers. We are willing to go the "extra mile" in order to accomplish your projects special needs. It can be best stated that... if you can imagine the possibility, we can design and build it. That's the way of Continental Bridge.



Eden Prairie, MN



Laguna Niguel, CA



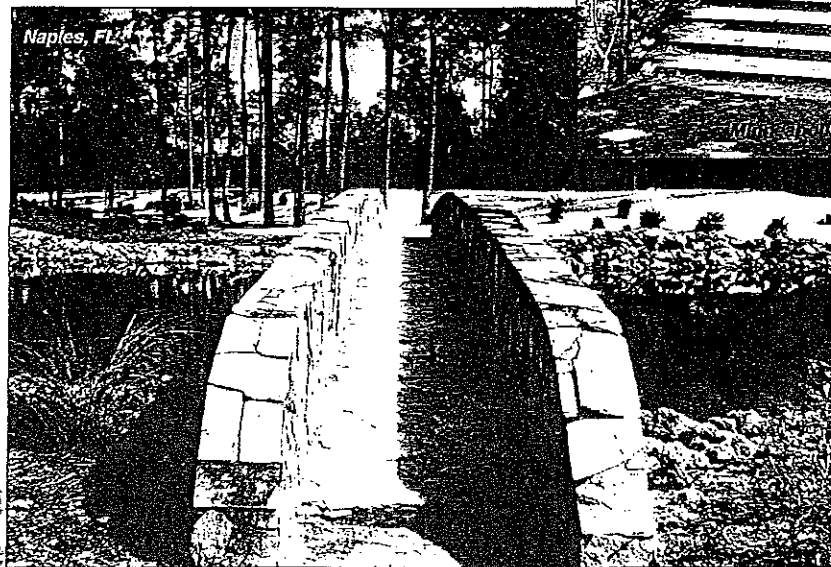
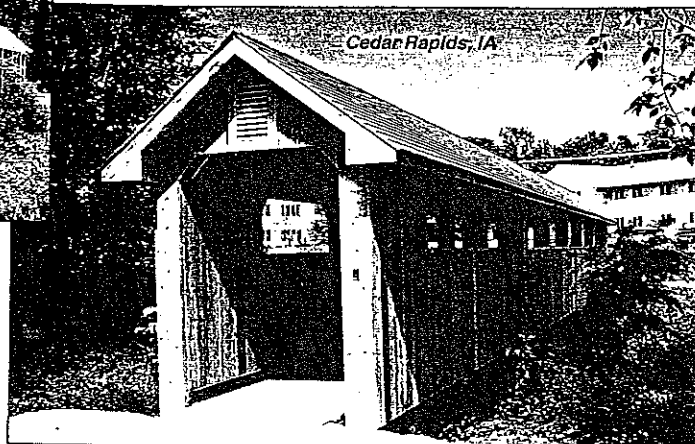
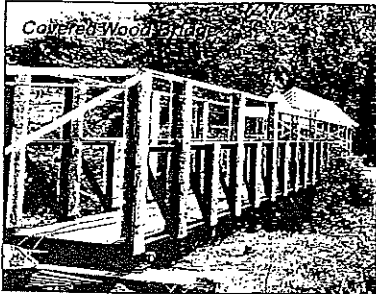
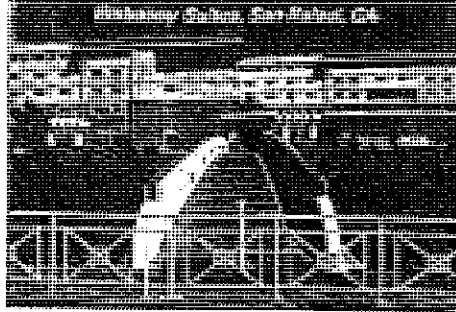
Ann Arbor, MI

*Unique bridges
for your special project!*



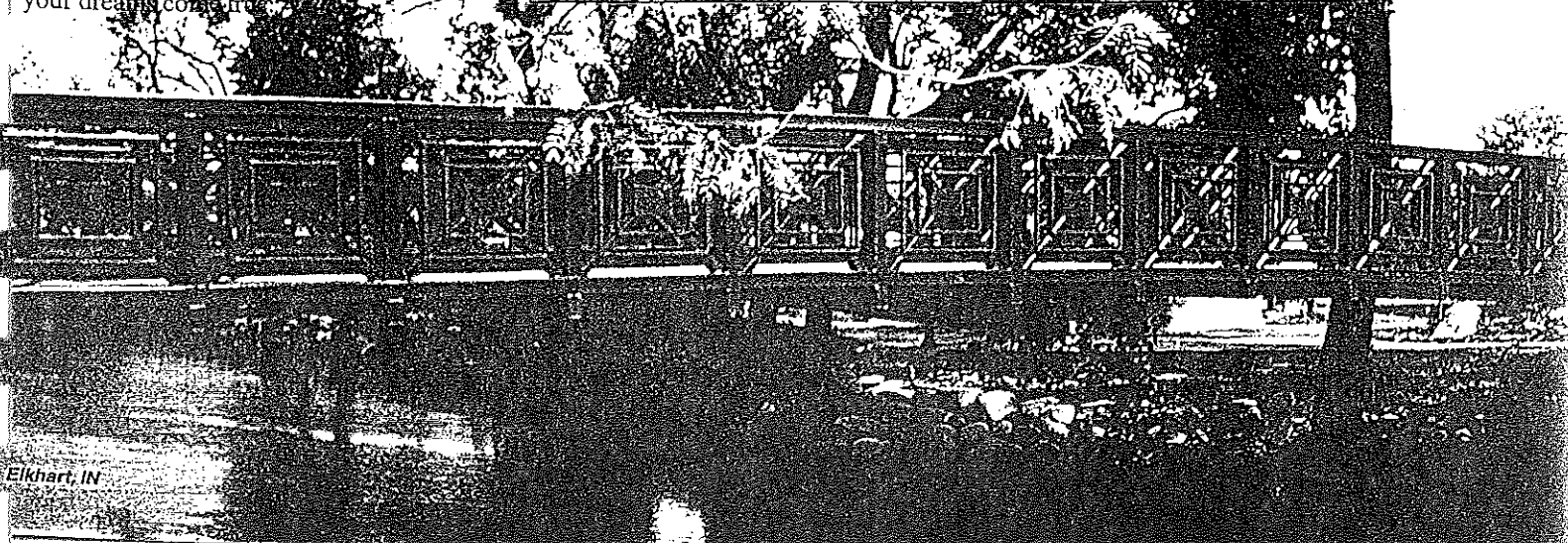
Where Leadership is Expected

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Call: 800-328-2047



Whatever special circumstances exist for your project. Continental Bridge can provide the innovative solutions. Our bridges have been used as gangways onto floating docks, cattle and wildlife crossings, and support systems within buildings. Also, we have bridges enclosed with stone, stucco, wood, or other materials, bridges that have decorative handrails attached or no rails at all, bridges with multi-color paint systems, and bridges that are uniquely lit with decorative lighting. In addition, we have designed and built cable-stayed, bowstring, stringer/girder, vierendeel truss, and many other types of structural systems. Be creative, and Continental will make your project a reality.

With your special structure also comes Continental's commitment to safety and the highest quality. We are dedicated to problem solving and providing you with the information you need. SPECOM™ allows us to aid you in the development of your specifications and reduce Specifier liability. Ask a Continental representative today, we can make your dream come true.



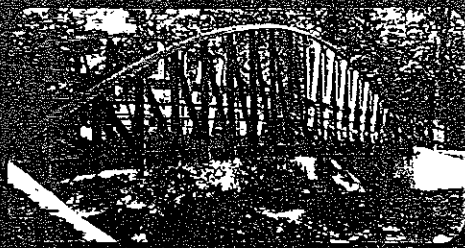


CAIN WADDELL
Sales & Estimating

4021 Gault Ave., South
Fort Payne, AL 35967
sales@steadfastbridge.com

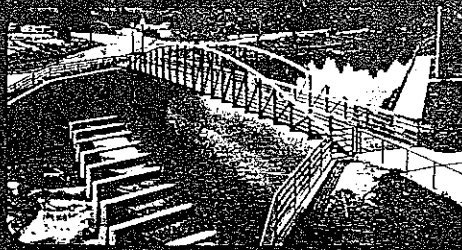
(256) 845-0154
(800) 749-7515
FAX (256) 845-9750

Cleveland, OH



10' x 120'

Greenville, SC



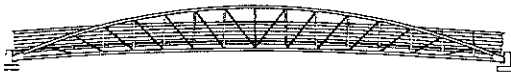
8' x 120'

Great Miami Riverwalk, Sidney, OH



14' x 170'

The "KEYSTONE" Bow Truss

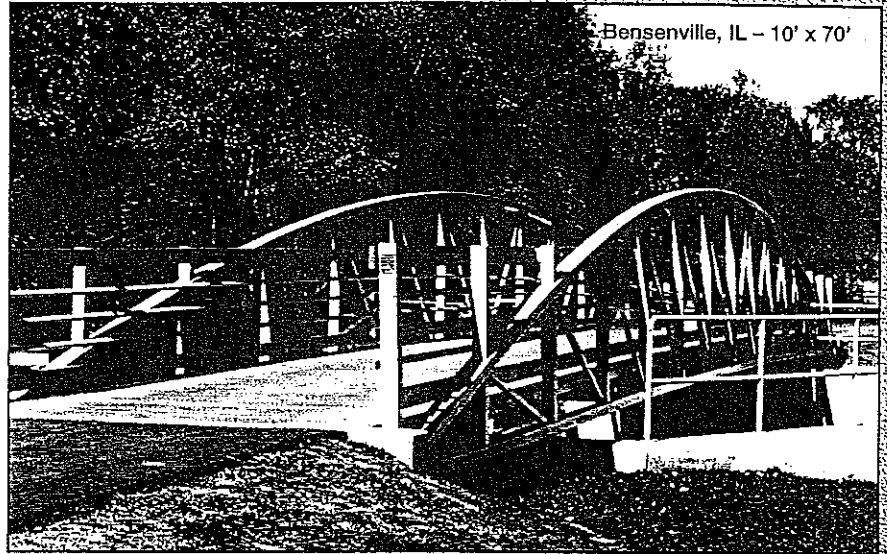


Steadfast Bridge Company is responsible for bringing this old favorite back to the marketplace. Standard designs go to 120' clear span. The "Keystone" can be furnished for spans to 250'.

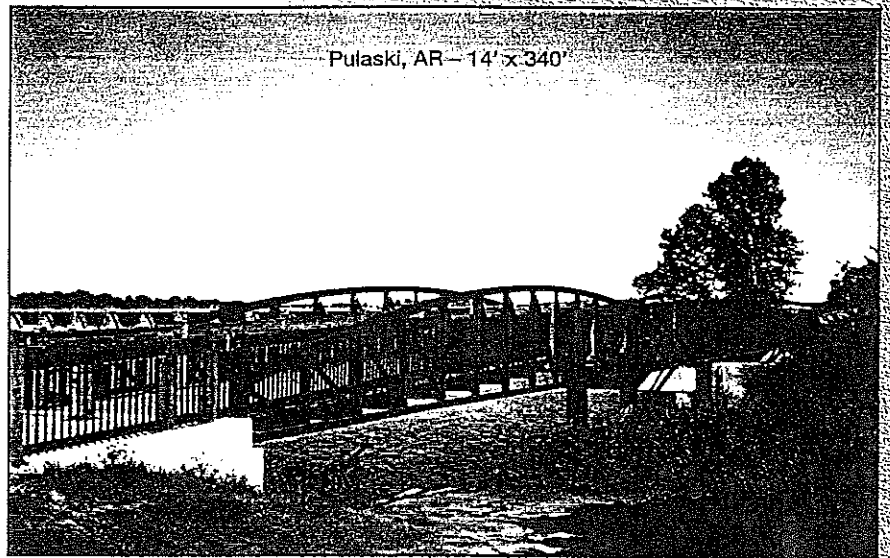
The properties of the ageless parabolic curve still offer one of the most efficient structural designs. The nostalgic appearance of the popular bow truss is still in high demand. The depth at the center is usually 10% of the clear span. With longer spans, the center depth may be reduced to 7% of the span.

✓ *Steadfast provides custom engineering, quality fabrication and nationwide delivery.*

Bensenville, IL - 10' x 70'



Pulaski, AR - 14' x 340'



Nantahala River, NC



2 - 8' x 72'

Murphreesboro, TN



10' x 166'

Walden Golf Course, Crofton, MD



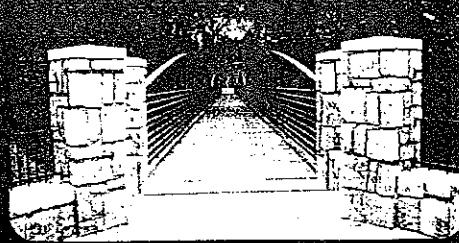
9' x 120'

Clearwater, FL



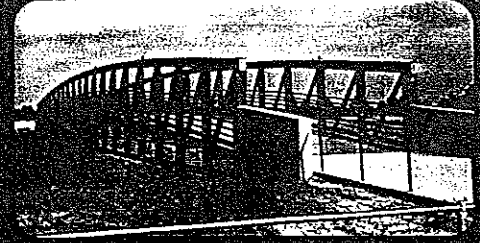
8' x 100'

Life University, Marietta, GA



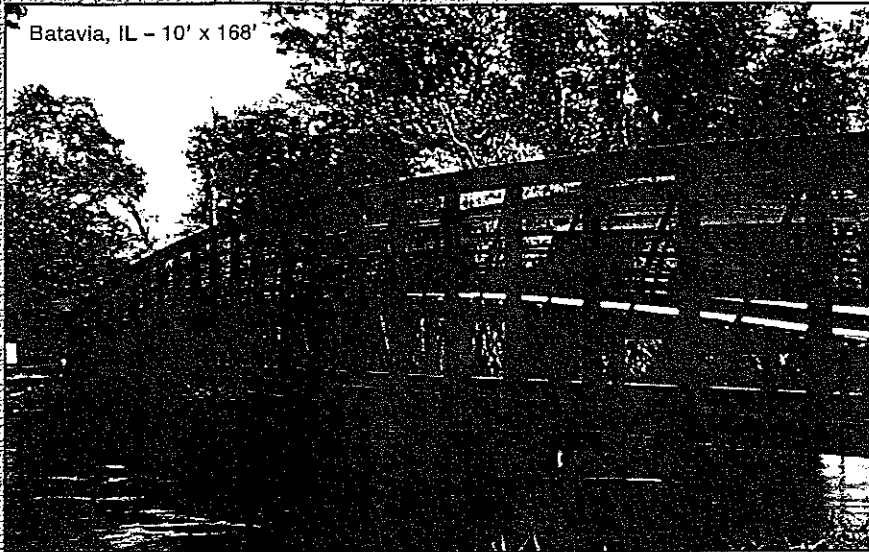
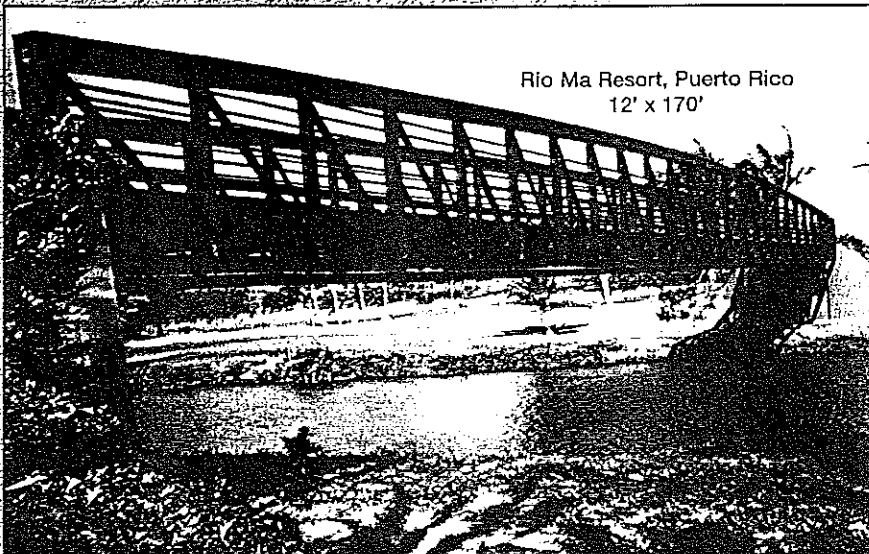
3-10' x 100'

Houston, TX



12' x 140'

Batavia, IL - 10' x 168'

Rio Ma Resort, Puerto Rico
12' x 170'

The "CAPSTONE" Modified Bow



Steadfast Bridge Company introduces the "Capstone" Series for projects requiring a long span bridge with limited approach space. The truss height of the "Capstone" varies to allow a low abutment backwall while still maintaining maximum truss depth at the center. This modified bow truss design also allows a constant rail height for an unobstructed view over the top chord. The "Capstone" is perfect for longer spans up to 250'.

✓ *Virtually all Steadfast Bridges can be installed in less than one day.*

02852/BIL

BuyLine 9266

Omaha, NE



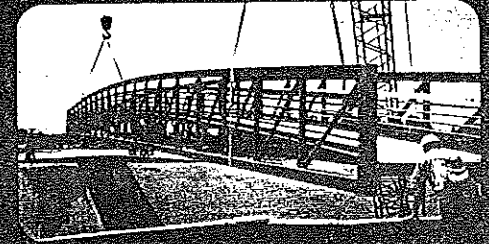
10' x 160'

Lebanon, AL



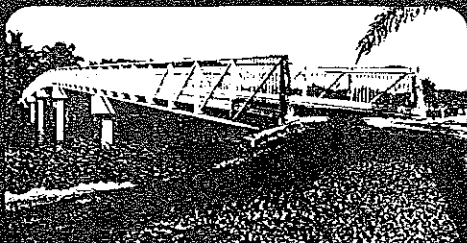
13' x 95'

Albuquerque, NM



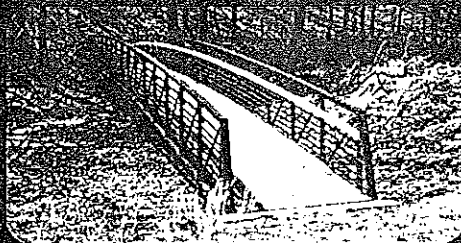
10' x 150'

Jupiter, FL



8.5' x 250'

Mills Road Park, Independence, KY



8' x 100'

Valparaiso, IN

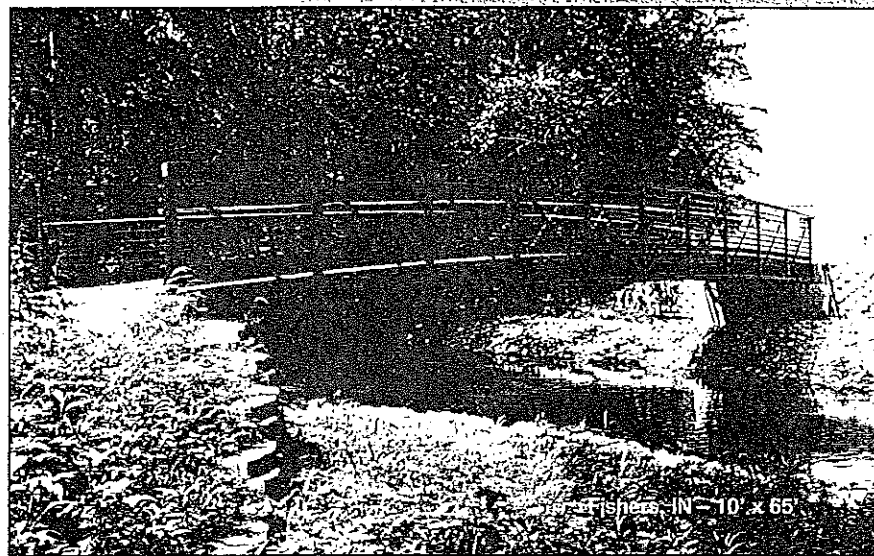


10' x 150'

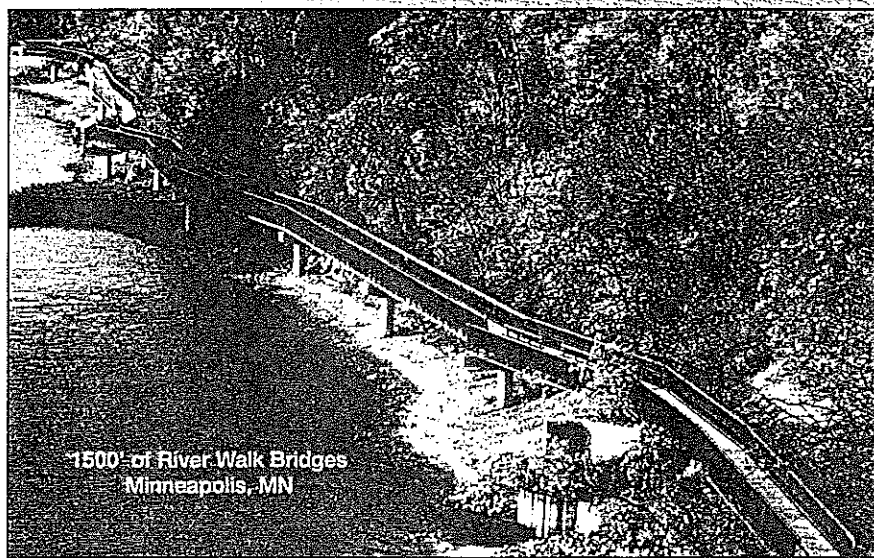
The "CONNECTOR" Pratt Truss



The "Connector" is the most familiar truss design. Our standard designs go to the 120' clear span range. By increasing the truss depth and raising the floor to form an "H", these spans can be increased to 220' for an efficient design.



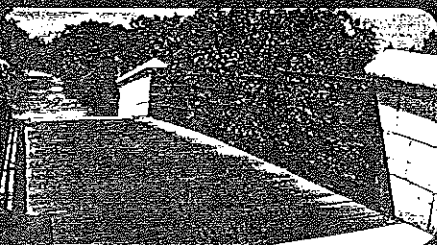
Fishers, IN - 10' x 65'

1500' of River Walk Bridges
Minneapolis, MN

✓ A Weathering Steel finish provides a virtually maintenance free bridge.

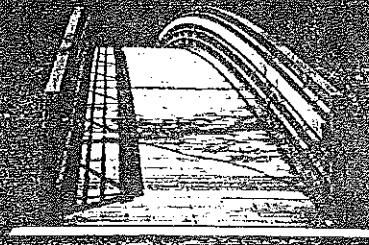
✓ Bridges may be cambered up to 2% of the span length. Flat bridges are also available.

Oceanview Golf Course, Bermuda



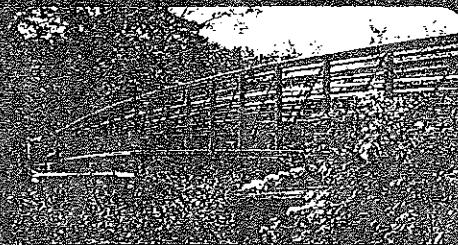
10' x 26'

Beckley, WV



6' x 82'

Lenox, MA

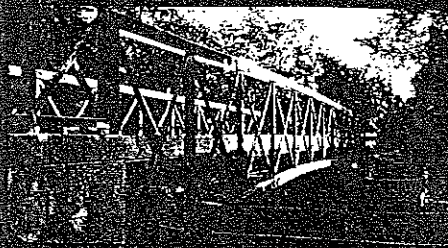


6' x 110'

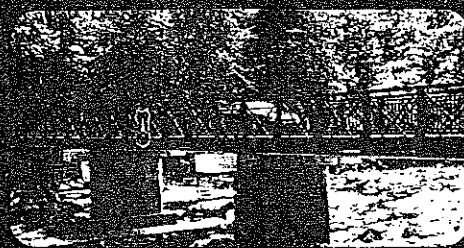
Indianapolis, IN

Ocoee, TN

Rancho Cañada Golf Course, Carmel, CA



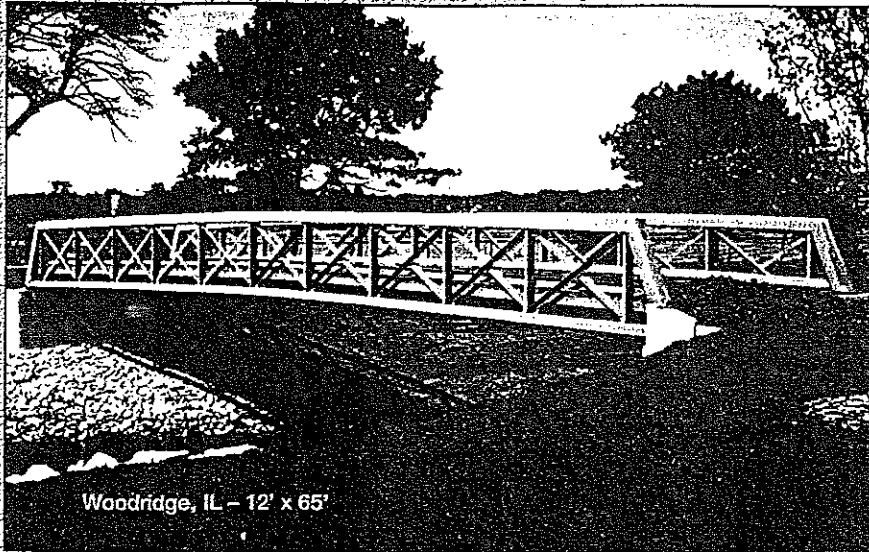
10' x 71.6'



4-14' x 49'



12' x 140'



Woodridge, IL - 12' x 65'



The "LINK" X-Brace Truss

This attractive companion to the "Connector" design is only slightly more expensive. The X brace panels add to the symmetry and beauty of the "Link" series. The "Link" is also available in spans to 220' similar to the "Connector."

✓ Our bridges can be painted with a wide variety of colors.

✓ Bridges up to 12' x 70' can be shipped in one piece.

02852/BIL

BuyLine 9266

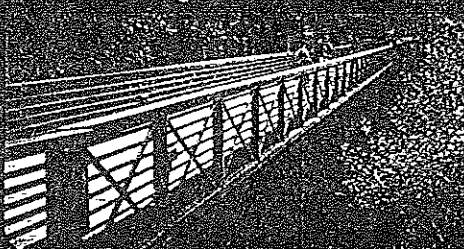
Lula Lake, Walker County, GA

UCSC College Ten, Santa Cruz, CA

Grafton, IL



10' x 65'



10' x 300'



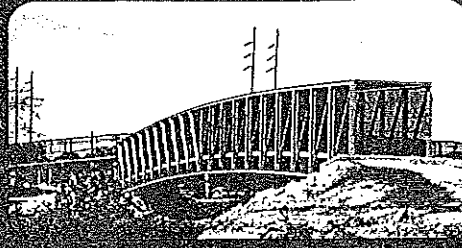
12' x 90'

Las Vegas, NV



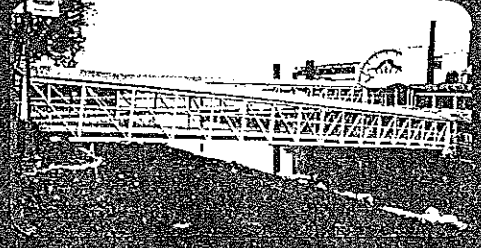
8' x 130'

Gadsden, AL



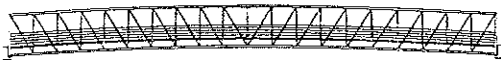
8' x 140'

Argosy Casino, Riverside, MO



2 - 8' x 110'

The "GATEWAY" Portal Bridge



The box or portal bridge is the most common truss design for vehicular bridges. We rely on the stability of the box girder for longer spans up to 240' and when heavier loading conditions may be required.

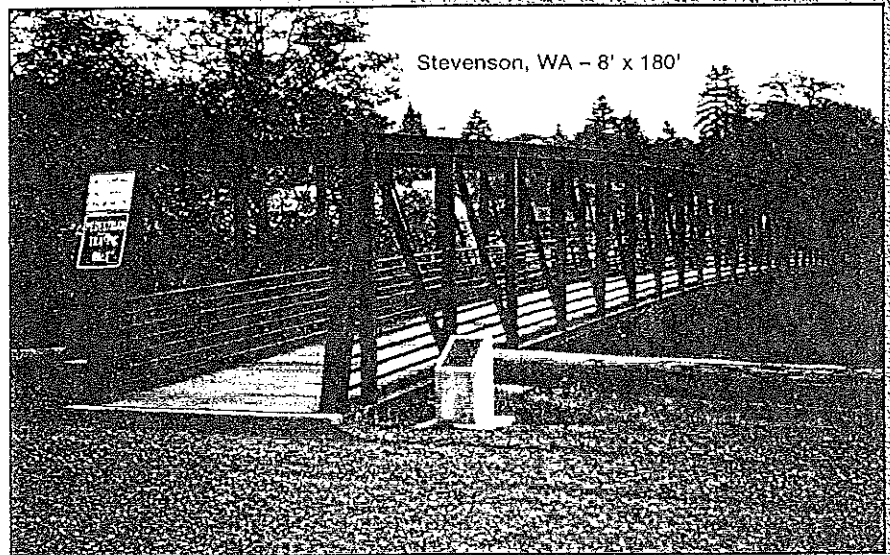
Even these longer, heavier spans can usually be erected in less than one day!

This design is particularly useful in highway and railroad overpasses where a security chain link fence is factory installed.

Cuyahoga, OH
8' x 150'

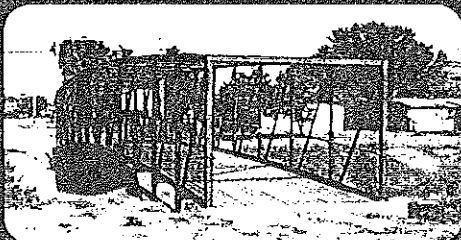
✓ Our factory installed pressure treated Southern Yellow Pine floors feature a limited lifetime warranty against rot and decay.

✓ Bridges with concrete or asphalt floors are furnished with a galvanized composite form deck. Pouring of the concrete or asphalt and furnishing reinforcement steel is by others.



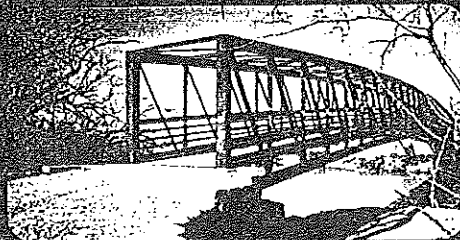
Stevenson, WA - 8' x 180'

Lake Fran Bike Trail, Orlando, FL



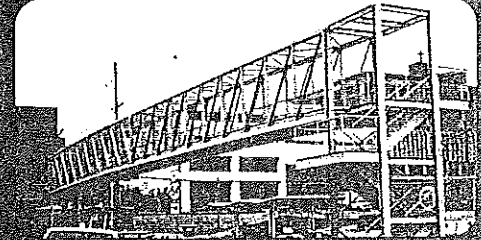
10' x 70'

Farmington, NM



8' x 180'

Jefferson City, MO



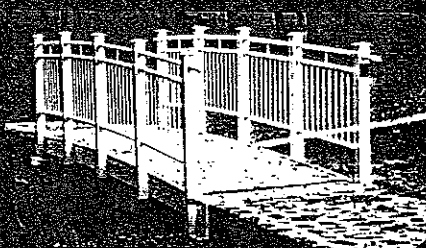
6' x 130'

Fairfield Recreation Area, Morrow, GA



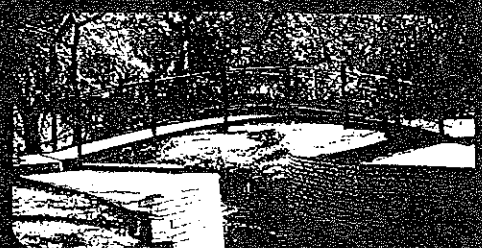
6' x 30'

Auburn, AL

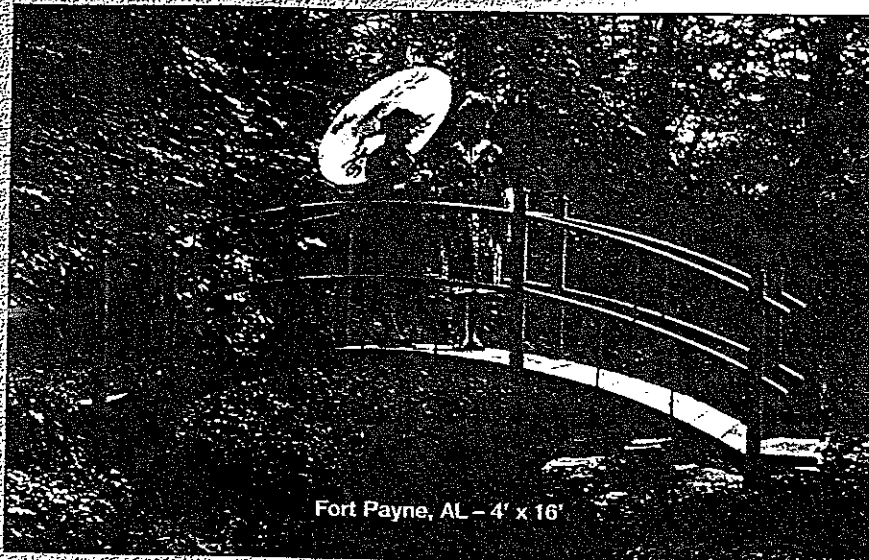


5' x 18'

Granbury, TX



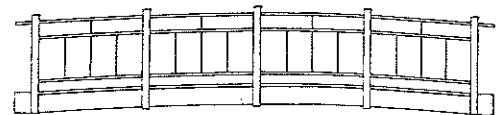
6' x 30'



Fort Payne, AL - 4' x 16'

The Quarry Golf Course
Chattanooga, TN - 10' x 42'

THE "EDO" Oriental Style



Although our original thought was to provide an attractive bridge for the landscape architect, the Oriental look has been applied to many other uses, even vehicular bridges. "Edo" is the ancient name for Tokyo and this style bridge has been popular all over the United States. The "Edo" has been particularly useful on golf courses and as an architectural feature for buildings and gardens.

THE "EXPRESSWAY" Low Rail Height



Golf course bridges are one of our specialties at Steadfast. The variety of designs is the main reason for our leadership in this field. We attach every plank of our wood floors with at least two plated fasteners at each crossing support and thru-bolting a high-strength steel bar along each edge. This method prevents noisy slapping of boards for golf cart use and inhibits warping of the wood. Our rugged design also provides the needed capacity for maintenance vehicles and pick-up trucks.

02852/BIL

BuyLine 9266

DeSoto Country Club, Fort Payne, AL



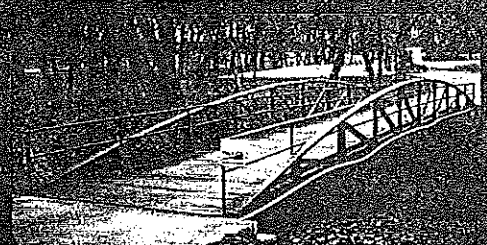
10' x 30'

Pine Creek Golf Course, Mt. Juliet, TN



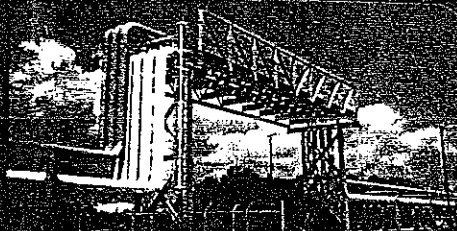
10' x 50'

Chase Oaks Golf Course, Plano, TX



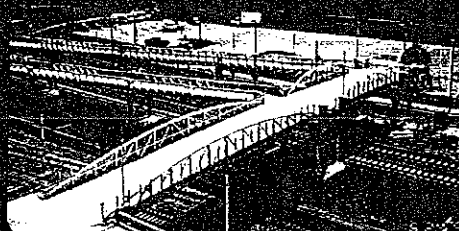
10' x 50'

Pipe Supports, Tampa, FL



16' x 53'

Football Stadium, Baltimore, MD



20' x 87', 20' x 45' Plus 6-70' Ramps

Conveyor Supports, Oxford, MS



8' x 194'

SPECIAL PROJECTS

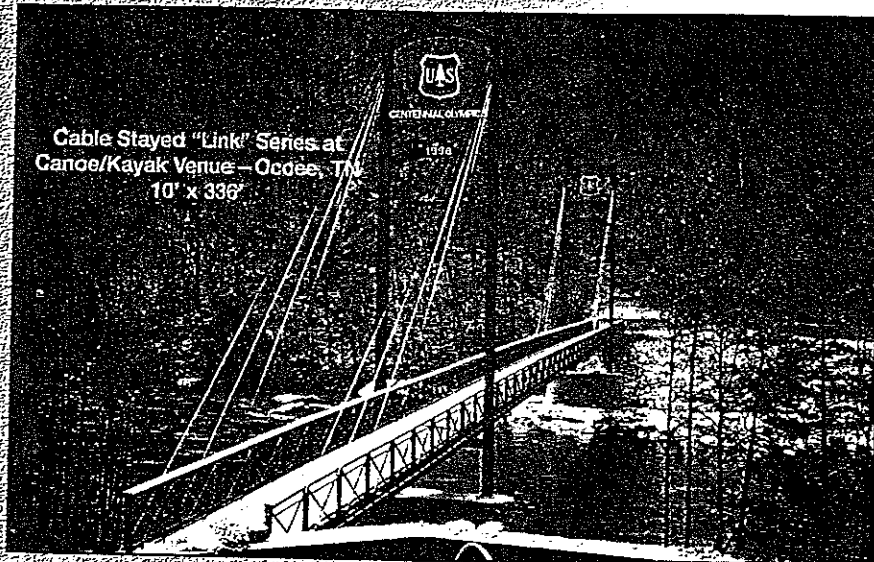
With over 30 years of bridge design experience, Steadfast has the ability to meet almost any bridge need. Steadfast is ready to accept any challenge from long span pedestrian overpasses and cable stayed bridges to industrial conveyor and pipe support bridges.

The Steadfast Cable Stayed design is an economical solution to long clear span pedestrian and light vehicular bridges. The Cable Stayed Bridge has been a popular design option since Steadfast made it available. Quite often it is the best answer to staying completely out of flood plains and environmentally sensitive wetland areas. The cost is low and the beauty and aesthetics are invaluable on the Cable Stayed Bridges spanning 180' to 400'.

For long spans over 200' that require a deep truss design, a modified version of the "Keystone" bow truss bridge can be utilized. By incorporating a horizontal splice in the truss, depths of 18' can be achieved allowing clear spans up to and over 250' when the use of a center pier is either impractical or impossible.

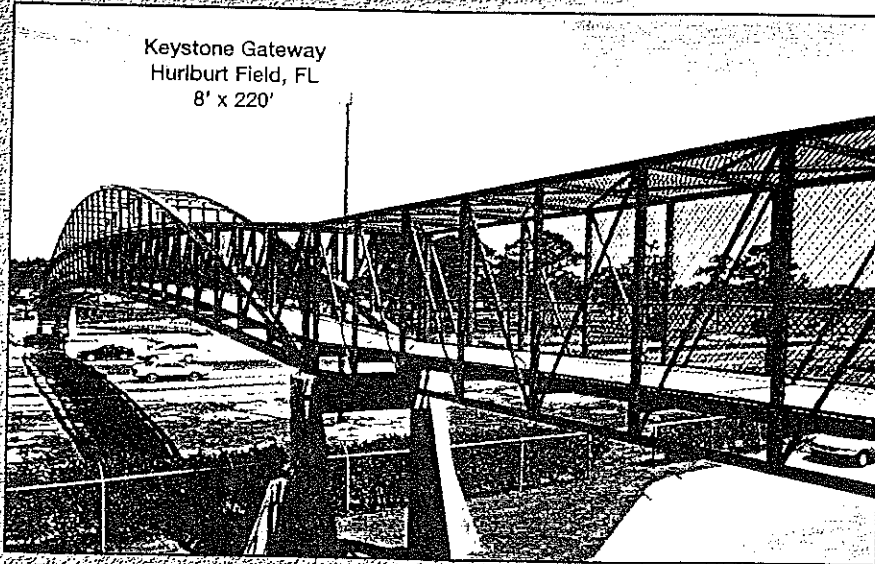
Cable Stayed "Link" Series at
Canoe/Kayak Venue—Ocoee, TN

10' x 336'



Keystone Gateway
Hurlburt Field, FL

8' x 220'



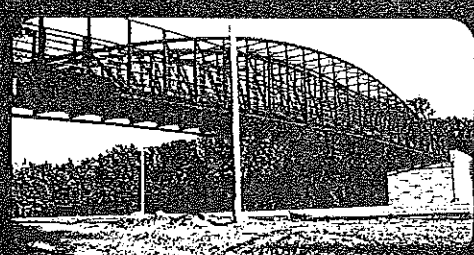
02852/BIL

BuyLine 9266

Cook County, IL



2-10' x 190'



Sidney, OH – Installation



10' x 170'



Installation of Steadfast wood flooring is unequalled

Columbia Lake, TX – Installation



4' x 30'

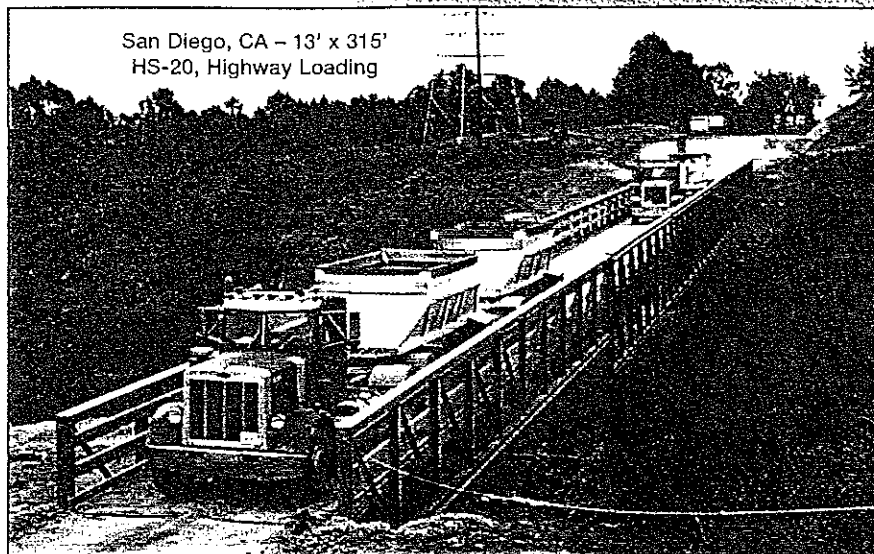
STEADFAST BRIDGE COMPANY...

...will assist you step by step through your bridge project. Whether you are an experienced Bridge Specifier or is this is your first bridge job, our team of engineers is available for your technical and budget requirements. Our engineering staff, licensed in 48 states, has designed thousands of bridges from small pedestrian bridges to AASHTO specified highway bridges.

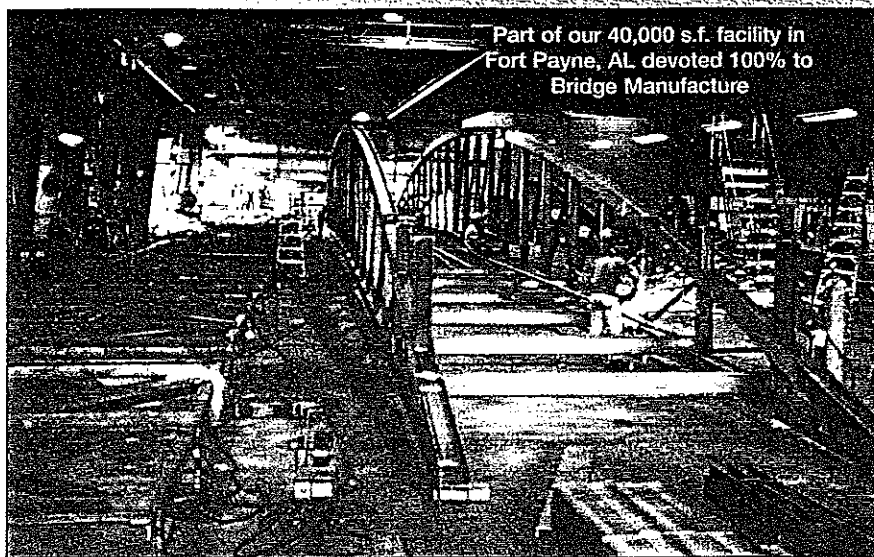
STEADFAST BRIDGE COMPANY has been certified by the American Institute of Steel Construction for fabrication of simple steel bridges (formerly known as AISC Category I Certification). Our Quality Assurance Program guarantees you the very best in design and workmanship.

Our Greenville, Alabama fabrication plant of 45,000 square feet and our original plant in Fort Payne, Alabama allow us to serve the growing demand for economical, prefabricated bridges.

Call our toll free number for immediate pricing and additional information.



San Diego, CA – 13' x 315'
HS-20, Highway Loading

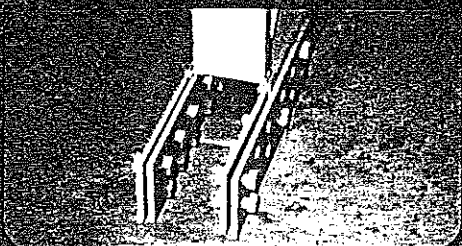


Part of our 40,000 s.f. facility in Fort Payne, AL devoted 100% to Bridge Manufacture

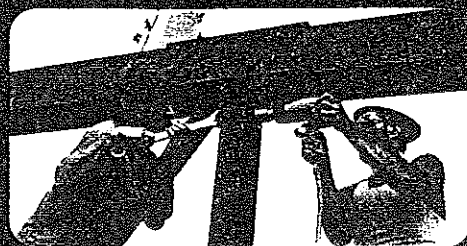
✓ *Single lane vehicular bridges with loading up to HS-20 are available.*



Personal Delivery



Typical Bolted Splice



No Field Welding

APPENDIX D







APPENDIX E

SUBSURFACE EXPLORATION LOG

Boring No.: 1
 Sheet: 1 of 6

Project Name: Bond Falls Pedestrian Bridges

Owner: MDNR

Site Location: _____

Soil Boring Location: West End of 60' Bridge

Job No.: 1020509

Architect/Engineer: Northwest Design Group

Date of Drilling: 06/05/02

Depth (feet)	Stand. Penetration Blows/ 6 inch	Recovery (%)	Sample Number	Sample Type	Description of Material	Unconfined Compression Strength (tons/sft) (X)					Remarks
						1	2	3	4	5	
						Plastic Limit (%)		Water Content (%)		Liquid Limit (%)	
						1	2	3	4	5	
					Surface Elevation: _____ ft.	Standard Penetration (N) (blows/foot) (O)					
						1	2	3	4	5	
5					0"-2" Brown/Red Silty SAND						
					2"-4" Brown Silty SAND						
					3.5'-4' Saturated GRAVEL						
10											
15											
20											
25											
30											
35											
40											

SS - Split Spoon
 HA - Hand Auger
 BH - Back Hoe
 WL - Water Level

The stratification lines represent approximate boundry lines between soil types. The material descriptions and strata lines are based on split spoon sample intervals and cuttings from the auger flights.

WL	Rig/Foreman:	Ben Banfield
WL	Logged by:	Mark Stoppel
WL	Approved by:	

NDG
Northwest Design Group

SUBSURFACE EXPLORATION LOG

Boring No.: 2
 Sheet: 2 of 6

Project Name: Bond Falls Pedestrian Bridges

Owner: MDNR

Site Location: _____

Soil Boring Location: South End of Proposed WestViewing Deck

Job No.: 1020509

Architect/Engineer: Northwest Design Group

Date of Drilling: 06/05/02

Depth (feet)	Stand. Penetration Blows/ 6 inch	Recovery (%)	Sample Number	Sample Type	Description of Material	Unconfined Compression Strength (tons/sft) (X)					Remarks
						1	2	3	4	5	
						Plastic Limit (%)		Water Content (%)		Liquid Limit (%)	
						10	20	30	40	50	
					Surface Elevation: _____ ft.	Standard Penetration (N) (blows/foot) (O)					
						10	20	30	40	50	
5					0 - 1' Sandy/Silty LOAM						
					1' - Fractured ROCK						
10											
15											
20											
25											
30											
35											
40											

SS - Split Spoon
 HA - Hand Auger
 BH - Back Hoe
 WL - Water Level

The stratification lines represent approximate boundry lines between soil types. The material descriptions and strata lines are based on split spoon sample intervals and cuttings from the auger flights.

WL	Rig/Foreman:	Ben Banfield
WL	Logged by:	Mark Stoppel
WL	Approved by:	

NDG

Northwest Design Group

SUBSURFACE EXPLORATION LOG

Boring No.: 3
Sheet: 3 of 6

Project Name: Bond Falls Pedestrian Bridges

Owner: MDNR

Site Location: _____

Soil Boring Location: East End of 62' Bridge

Job No.: 1020509

Architect/Engineer: Northwest Design Group

Date of Drilling: 06/05/02

Depth (feet)	Stand. Penetration Blows/ 6 inch	Recovery (%)	Sample Number	Sample Type	Description of Material	Unconfined Compression Strength (tons/sft) (X)					Remarks	
						1	2	3	4	5		
						Plastic Limit (%)		Water Content (%)		Liquid Limit (%)		
						1	10	20	30	40		50
Standard Penetration (N) (blows/foot) (O)						1	10	20	30	40	50	
					Surface Elevation: ft.	1	10	20	30	40	50	Remarks
					0 - 1.5' Silty Loamy SAND							
					1.5' - 3.0' Brown Silty Saturated SAND							
					3.0' - ROCK							
5												
10												
15												
20												
25												
30												
35												
40												

SS - Split Spoon


HA Hand Auger

BH - Back Hoe

WL - Water Level

SS - Split Spoon
 (HA) Hand Auger
 BH - Back Hoe
 WL - Water Level

The stratification lines represent approximate boundry lines between soil types. The material descriptions and strata lines are based on split spoon sample intervals and cuttings from the auger flights.

WL	Rig/Foreman:	Ben Banfield	
WL	Logged by:	Mark Stoppel	
WL	Approved by:		

SUBSURFACE EXPLORATION LOG

Boring No.: 4
 Sheet: 4 of 6

Project Name: Bond Falls Pedestrian Bridges
 Owner: MDNR

Site Location: _____

Soil Boring Location: West End of 84' Bridge

Job No.: 1020509

Architect/Engineer: Northwest Design Group

Date of Drilling: 06/05/02

Depth (feet)	Stand. Penetration Blows/ 6 inch	Recovery (%)	Sample Number	Sample Type	Description of Material	Unconfined Compression Strength (tons/sft) (X)					Remarks
						1 1	1 2	1 3	1 4	1 5	
						Plastic Limit (%) Water Content (%) Liquid Limit (%)					
					1 10	1 20	1 30	1 40	1 50		
Standard Penetration (N) (blows/foot) (O)											
Surface Elevation: ft.					1 10	1 20	1 30	1 40	1 50		
					0 - 1' Loam TOPSOIL						
					1' - 3' Red Brown SAND						
					3' - 3.5' Brown Coarse Moist SAND						
					3.5' - 4' Brown SAND with Some Silt Saturated						
					4' ROCK						
5											
10											
15											
20											
25											
30											
35											
40											

SS - Split Spoon


HA Hand Auger

BH - Back Hoe

WL - Water Level

SS - Split Spoon
 HA - Hand Auger
 BH - Back Hoe
 WL - Water Level

The stratification lines represent approximate boundary lines between soil types. The material descriptions and strata lines are based on split spoon sample intervals and cuttings from the auger flights.

WL	Rig/Foreman:	
WL	Ben Banfield	
WL	Logged by:	
WL	Mark Stoppel	
WL	Approved by:	

SUBSURFACE EXPLORATION LOG

Boring No.: 5

Sheet: 5 of 6

Project Name: Bond Falls Pedestrian Bridges

Owner: MDNR

Site Location: _____

Soil Boring Location: West End of 84' Bridge

Job No.: 1020509

Architect/Engineer: Northwest Design Group

Date of Drilling: 06/05/02

Depth (feet)	Stand. Penetration Blows/ 6 inch	Recovery (%)	Sample Number	Sample Type	Description of Material	Unconfined Compression Strength (tons/sft) (X)					Remarks		
						1	2	3	4	5			
						Plastic Limit (%)			Water Content (%)			Liquid Limit (%)	
						10	20	30	40	50			
					Surface Elevation: _____ ft.	Standard Penetration (N) (blows/foot) (O)							
						1	2	3	4	5			
0					0-6" Loamy Sandy TOPSOIL								
					6" - 1'0" Red Brown SAND								
5													
10													
15													
20													
25													
30													
35													
40													

SS - Split Spoon
 HA - Hand Auger
 BH - Back Hoe
 WL - Water Level

The stratification lines represent approximate boundry lines between soil types. The material descriptions and strata lines are based on split spoon sample intervals and cuttings from the auger flights.

WL	Rig/Foreman:	Ben Banfield
WL	Logged by:	Mark Stoppel
WL	Approved by:	

NDG
Northwest Design Group

SUBSURFACE EXPLORATION LOG

Boring No.: 6
 Sheet: 6 of 6

Project Name: Bond Falls Pedestrian Bridges
 Owner: MDNR
 Site Location: _____
 Soil Boring Location: Middle of Proposed East Viewing Deck

Job No.: 1020509
 Architect/Engineer: Northwest Design Group
 Date of Drilling: 06/05/02

Depth (feet)	Stand. Penetration Blows/ 6 inch	Recovery (%)	Sample Number	Sample Type	Description of Material	Unconfined Compression Strength (tons/sft) (X)					Remarks	
						11	12	13	14	15		
						Plastic Limit (%)			Water Content (%)			Liquid Limit (%)
						110	120	130	140	150		
					Surface Elevation: _____ ft.	Standard Penetration (N) (blows/foot) (O)						
						110	120	130	140	150		
5					0-3" TOPSOIL							
					3" - 6" Red Brown SAND							
					6" - 1.75' Red Brown Saturated SAND							
					1.75' - 3' Gray Silty MUCK							
					3' ROCK							
10												
15												
20												
25												
30												
35												
40												

SS - Split Spoon
 HA - Hand Auger
 BH - Back Hoe
 WL - Water Level

The stratification lines represent approximate boundry lines between soil types. The material descriptions and strata lines are based on split spoon sample intervals and cuttings from the auger flights.

WL	Rig/Foreman:	Ben Banfield
WL	Logged by:	Mark Stoppel
WL	Approved by:	

NDG
Northwest Design Group

APPENDIX F