

## REGISTRATION SHEET

Register your Redi-Rock Design Resource Manual (DRM) online at [www.redi-rock.com/drm](http://www.redi-rock.com/drm) or fax this sheet to 231-237-9521 so we can inform you of technical updates as they become available. *We respect your privacy* and will only distribute updates as they become available.

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Thank you for taking a moment to review Redi-Rock's 2011 Edition Design Resource Manual.

With the release of the 2011 Edition Design Resource Manual, Redi-Rock International is putting forth its most recent advancements including several new products, improvements to our online presence, and we have expanded our producer network in an effort to better meet market demands. There is no better time than now to use Redi-Rock products.

Here are the highlights of the 2011 Edition Design Resource Manual:

- 1) **The Positive Connection System** – We have developed a way to reinforce Redi-Rock walls that utilizes the strength of the given geogrid. This will enable the product to meet the current AASHTO-LRFD requirements.
- 2) **The LedgeStone Texture** – throughout this resource manual, our website, and through N. America, you will see more than ever the superior look of Redi-Rock's LedgeStone texture.
- 3) **2011 Edition Installation Manual** – the Installation manual has undergone a complete re-write in an effort to more clearly articulate how to effectively install Redi-Rock products.
- 4) **21" Block** –The 21" section has been removed from the Design Resource Manual due to the implementation of the Positive Connection System. The 21" block information can still be found online.
- 5) **www.Redi-Rock.com** – The 2011 Edition Design Resource Manual mirrors some of the data found online at [www.redi-rock.com](http://www.redi-rock.com). Our website remains the most complete resource to find technical tools, to become informed of updates, to communicate with Redi-Rock International and its manufacturing network, and to communicate with others who have used Redi-Rock products.

Redi-Rock International is committed to continually improving its products, processes, manufacturing network and service. If there is anything we can do for you, then please let us know. We are eager to earn your business.

At Your Service,

A handwritten signature in black ink that reads "Ben Manthei". The signature is written in a cursive, slightly stylized font.

Ben Manthei  
Managing Partner  
Redi-Rock International

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# DESIGN RESOURCES

THE ESSENCE OF NATURAL ROCK

**REDI-ROCK**

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Every Redi-Rock distributor/manufacture is independantly owned and operated. Patents pending on various design criteria. We reserve the right to modify design or specifications without incurring obligation.

## Florence Storm Channel

### Project Name

Florence Storm Channel

### Customer Name

City of Florence, KY

### Design / Specifying Engineer

Viox & Viox, Inc.

### Geotechnical Engineer

H. C. Nutting/Terracon

### Contractor

Dudley Construction Company

### Block Manufacturer

Redi-Rock Structures of OKI

### Wall Installer

Redi-Rock of Kentuckiana

### Project Location

Florence, KY

### Year Built

2010

### 'Home Run' storm channel installs in just two weeks

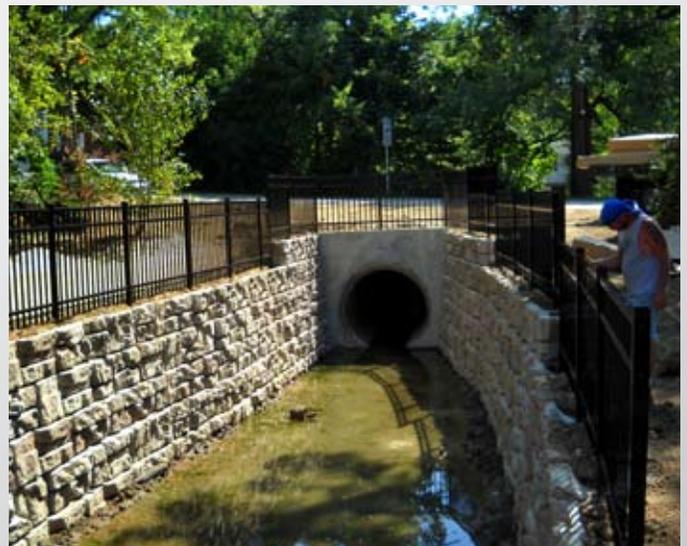
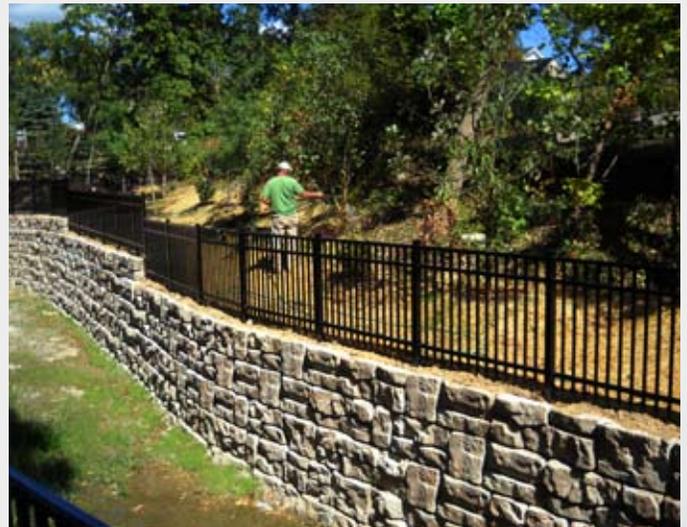
When a sharp turn in a stream began eroding homeowners' yards in storm events, the city of Florence, Kentucky needed a solution, and fast. Erosion to the 10 ft. high stream bank was becoming a major issue, and the city wanted to take care of the problem before it caused serious damage.

The city's goal was to minimize excavation and disturbance to residential yards. "The ability to construct the wall without geogrid reinforcement was critically important to this project," explained the project's engineer. "The construction space was tight."

City of Florence Project Manager Peter Glenn explained: "We originally considered using gabion baskets or plain concrete walls, but we wanted an aesthetic finish to the channel. We chose Redi-Rock because we had more finish options, including the new LedgeStone face. Plus, it was very economical."

"It's a home run when you can put up an aesthetic channel like this instead of the usual concrete channel or gabion baskets in an economical way," he added.

Redi-Rock walls have a proven track record in storm channel applications. The blocks stack like giant Legos, making them quick and easy to install using an excavator and a small crew. In total, the 4,800 sq. ft. walls took less than two weeks to install. At the highest point, the walls stand 13.5 ft.



## Andrew S. Rosell Memorial Fire Bowl

**Project Name:**

Andrew S. Rosell Memorial Fire Bowl

**Customer Name:**

Camp Cowles

**Block Manufacturer:**

Wilbert Precast

**Project Location:**

Pend Oreille County, Washington

**Design/Specifying Engineer:**

Design/Build

**Wall Installer:**

Wilbert Precast

**Year Built:**

2010

### Father creates innovative memorial for his scouting son

When 16-year-old Andrew S. Rosell's life was cut tragically short in a 2007 traffic accident, his father Ed Rosell found it fitting to use part of the settlement to create a memorial for his Scouting son. The Rosells had been involved with the Camp Cowles Boy Scout Camp, and Ed Rosell settled on renovating the camp's amphitheater "Fire Bowl" to commemorate his son's life.

Based on several other successful amphitheater projects around the country, Redi-Rock was chosen for the project. With the help of Wilbert Precast and the camp, the creative, new fire bowl design that would seat more than 300 people started to take shape.

Part of the design of the project included creating better access to the fire bowl and making it ADA accessible. "We have a lot of grandparents who come for ceremonies here, and the fire bowl has a lot safer access now," explained camp ranger Jack Graham.

Project manager Rick Lindberg of Wilbert Precast explained: "The design of this project really used every product in the Redi-Rock arsenal. From retaining walls, to steps, to caps, to freestanding walls, pavers, and columns—this project had it all."



## Riverside Drive

### Project Name

Riverside Drive Improvement

### Customer Name

City of Cincinnati

### Design / Specifying Engineer

City of Cincinnati Department of Transportation and Engineering

### Block Manufacturer

Redi-Rock Structures of OKI  
Independence, KY

### Wall Installer

Ray Prus Construction

### Project Location

Cincinnati, Ohio

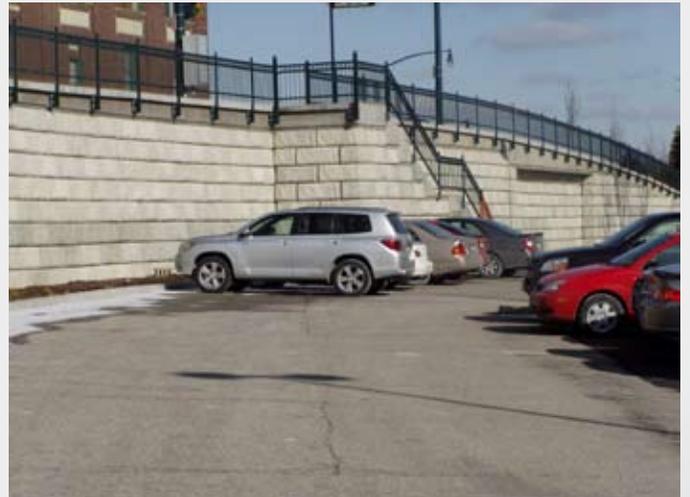
### Year Built

2007

As part of the Riverside Drive improvement project, the City of Cincinnati was renovating a busy downtown street and providing parking below for a popular riverfront park. In order to maximize parking space, the city required a retaining wall with the structural stability to support the roadway above.

The City of Cincinnati also wanted a product that had the appropriate visual scale for the 900 ft. (275 m) long wall as well as a look that would replicate the natural limestone that is prevalent throughout the downtown area. Redi-Rock Structures of OKI proposed a no-batter Redi-Rock wall system to maximize parking for this wall, allowing “clean” corners and the natural limestone look the city wanted.

Cincinnati Department of Transportation and Engineering Department chose Redi-Rock retaining wall systems based on the look of the blocks coupled with the engineered strength the walls offered. The 900 ft. (275 m) long gravity and reinforced wall is 21 ft. (6.5 m) tall at the highest point. Redi-Rock of OKI, the block producer, manufactured these Redi-Rock blocks with a zero degree batter angle which saved valuable space for parking. The massive size of each Redi-Rock block matched the scale of this project. With nearly 6 sq. ft. (.55 sq. m) of face on every one-ton block, this Redi-Rock wall offered the design flexibility this project required.



## Elmwood Rd. Bridge

**Project Name**

Elmwood Rd. Bridge

**Customer Name**

Clermont County, Ohio

**Design / Specifying Engineer**

Todd Gadbury, P.E., Clermont County Bridge Engineer

**Block Manufacturer**

Redi-Rock Structures of OKI

**Wall Installer**

Clermont County

**Project Location**

Clermont County, Ohio

**Year Built**

Late 2010

### Gravity Abutments Go Up Quick on Ohio Road

When Clermont County in Ohio needed to repair a deteriorating bridge quickly, they turned to Redi-Rock for a fast, aesthetic solution. Massive, one-ton Redi-Rock blocks are known for their ability to harness the power of gravity to build tall walls that prevent erosion and often don't require reinforcement.

"The quickest way to repair the bridge was to remove the beams and replace the abutments using Redi-Rock blocks," explained Clermont County's Bridge Engineer Todd Gadbury, P.E.

The bridge deck was placed directly atop the 13.5 ft. tall gravity Redi-Rock abutments. This allowed the county to save on installation time and costs.

Redi-Rock's new LedgeStone texture also helped the project blend in with the natural landscape. "It looks good, and we've gotten a lot of compliments. It adds nice character to the bridge," said Gadbury, P.E.

Redi-Rock is the perfect solution for projects that require fast, aesthetic solutions. The ability to build tall gravity walls and coordinating retaining walls, freestanding walls, and more give you the flexibility you need to build your next road or bridge project.



## Rail Runner Express Walls

### Project Name

New Mexico Rail Runner Express Walls

### Customer Name

New Mexico DOT

### Project Engineer

HNTB

### Redi-Rock Wall Engineer

Don MacCormack, PE, MacCormack Engineering (Albuq. NM);  
Steven A. Hooper, PE, Materials Inc./Buildology

### Geotechnical Engineer

Terracon

### Block Manufacturer

Materials Inc./Buildology

### Contractor / Wall Installer

Joint venture with Kiewit New Mexico  
(formerly Twin Mountain Construction) and Herzog

### Year Built:

2006-2008

### Project Location

Greater Santa Fe area, New Mexico

### Redi-Rock walls aid commuter train construction

When the Rail Runner Express commuter train needed retaining walls and bridge abutments along the rail line, engineers chose Redi-Rock retaining wall systems for the job. The train carries commuters from Santa Fe to Belen (south of Albuquerque). To give commuter trains the right of way, NM DOT purchased the railway from Burlington Northern Santa Fe.

Project engineers specified Redi-Rock to create bridge abutments to prevent erosion and provide an aesthetic finish along the line. Redi-Rock is a large block retaining wall system made of precast concrete that has the look of natural stone. Redi-Rock installs easily like one-ton Lego blocks, and has the ability to build tall gravity walls and even taller reinforced walls.

The engineers liked the versatility of the Redi-Rock system, as there were several different wall configurations required for the project. In total, the project required six walls comprised of 2,164 Redi-Rock blocks or approximately 12,440 sq. ft. of retaining walls. Plus, two walls required a zero degree batter to abut box culverts and three walls required custom blocks to accommodate drainage pipe.

For this project, engineers designed both gravity and reinforced walls in Redi-Rock's Limestone texture. The tallest wall was approximately 20 ft. tall.



## Sullivan Residence

**Project Name**

Sullivan Residence

**Customer Name**

Sullivan Family

**Design / Specifying Engineer**

Design/Build

**Block Manufacturer**

Redi-Rock of Kentuckiana

**Wall Installer**

Redi-Rock of Kentuckiana

**Project Location**

Louisville, KY

**Year Built**

2010

### Ledgestone Solution for High-End Home

When James P. Gregg of Gregg Custom Building began building the Sullivan Residence, he needed a retaining wall system that could match the grandeur of the home itself.

“We decided to go with Redi-Rock because it looked great, and there was a definite cost savings as compared to pouring a wall and facing it with brick,” Gregg explained.

The goal for the walls included creating a level space for a pool and pool deck, as well as adding to the aesthetics of the new home. Because Redi-Rock freestanding and retaining blocks are designed to build sweeping inside and outside curves, this project’s design flowed seamlessly. The walls also integrated fencing on top.

“When the wall was about half completed, the owners decided they wanted to expand the walls and add another staircase, and the versatility of the product allowed us to change the scope of work to really open up the pool area to the back yard,” Gregg said.

The entire project was designed using Redi-Rock gravity walls, standing 12 ft. high at the highest point with two courses of freestanding blocks on top. In total, the project used approximately 2,300 sq. ft. of Redi-Rock, including 80 cap blocks.





# GENERAL INFORMATION

THE ESSENCE OF NATURAL ROCK

**REDI-ROCK**

ASSUMPTIONS  
SOFTWARE AVAILABLE

Redi-Rock International  
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## ENGINEERING ASSUMPTIONS

The preliminary wall height charts shown on the following pages are based on our understanding of the concepts and principles for design of segmental block and precast modular block retaining walls as described in the National Concrete Masonry Association (NCMA) Design Manual for Segmental Retaining Walls, Third Edition and the American Association of State Highway and Transportation Officials (AASHTO) Bridge Design Specifications.

Calculations for the 41" Series, 60" Series, and 9" Setback Series are based on an Allowable Stress Design (ASD) approach for precast modular block retaining walls. The minimum factors of safety used in the analysis are listed on the preliminary charts.

Calculations for the 28" Series are based on an Allowable Stress Design (ASD) approach for segmental retaining walls. The calculations are in general accordance with NCMA's Design Manual for Segmental Retaining Walls, Third Edition. The minimum factors of safety used in the analysis are listed on the preliminary charts.

Calculations for the PC (Positive Connection) Series are based on a Load and Resistance Factor Design (LRFD) approach. The calculations are in general accordance with the AASHTO 2010 LRFD Bridge Design Specifications.

The preliminary wall height charts and typical section drawings are not intended to be used for actual construction. All final designs for construction must be performed by a registered Professional Engineer who is familiar with and qualified to design segmental retaining wall structures. The final design must use the actual conditions of the proposed site. The final wall design must address both internal and external drainage issues for the wall.

Redi-Rock walls are not limited to the applications, specific block combinations, or heights shown in these charts. A registered Professional Engineer can determine the final suitability of Redi-Rock blocks to your specific application.

### MATERIAL ASSUMPTIONS USED FOR WALL ANALYSIS

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Unit Weight of Concrete	143 pcf
Minimum Concrete Compressive Strength	4,000 psi
Sands and Gravels	
Soil Unit Weight	120 pcf
Soil friction angles ( $\Phi$ )	28°, 30°, and 34°
Crushed Stone	
Soil Unit Weight	130 pcf
Soil friction angle ( $\Phi$ )	40°
Infill Soil Unit Weight	120 pcf
Wall Infilled Unit Weight (PC and Non-PC blocks)	130 pcf

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Global stability has not been addressed in these charts. The Professional Engineer responsible for the final wall design must verify adequate wall stability, including global stability, using site-specific conditions.

Geogrid connection and interface shear design values are based on testing performed by Bathurst, Clarabut Geotechnical Testing, Inc. Test reports are available on the Redi-Rock website, [www.redi-rock.com](http://www.redi-rock.com)

**The wall infilled unit weight is 130 pounds per cubic foot for PC and Non-PC Redi-Rock blocks. As a result, PC or Non-PC middle and top blocks can be used interchangeably in construction without impacting the wall stability calculations.**

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 MINIMUM TURNING RADIUS
 

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<i>Length of Block</i>	<i>Radius in Feet</i>	<i>Direction of Turn</i>
46 1/8"	14'-6"	convex or concave
22 13/16"	8'-0"	convex or concave

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These assumptions were made to provide Redi-Rock International with a range of approximate retaining wall heights available in different conditions. The preliminary wall heights were calculated using assumed material properties, loading conditions, and terrain. Actual conditions will vary from site to site. For this reason, all final designs for construction must be performed by a registered Professional Engineer who is familiar with and qualified to design segmental retaining wall structures. The final design must use the actual conditions of the proposed site. The final wall design must address both internal and external drainage issues for the wall.

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## COMMERCIALY AVAILABLE ENGINEERING RESOURCES

RRW (Redi-Rock Wall) by Fine – Civil Engineering Software

(ASD (Classical) and LRFD) Freeware package for analysis of gravity Redi-Rock retaining walls.

Not intended for reinforced soil walls.

Download free at [www.redi-rock.com](http://www.redi-rock.com)

MSEW (Mechanically Stabilized Earth Walls) by ADAMA Engineering, Inc.

(ASD and LRFD) MSEW will handle more complex loading and wall geometry, including tiered walls. Also performs slope stability. MSEW follows AASHTO and FHWA guidelines.

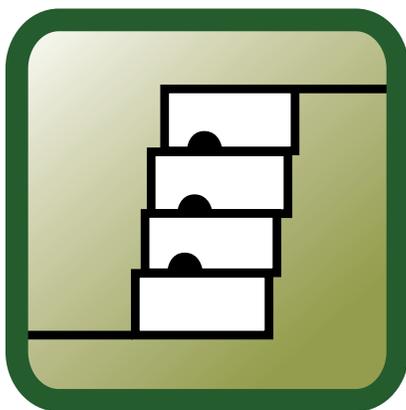
Available at [www.msew.com](http://www.msew.com)

NCMA Design Manual for Segmental Retaining Walls, 3<sup>rd</sup> Edition, National Concrete Masonry Association, 13750 Sunrise Valley Drive, Herndon, Virginia 20171-4662 (703) 713-1900

NCMA Design Software for Segmental Retaining Walls – SRWall

(ASD) SRW design for both conventional gravity and reinforced soil walls with simple geometry.

Available at [www.ncma.org](http://www.ncma.org)



# REDI-ROCK WALL

Download Free  
Analysis Software

## [www.redi-rock.com](http://www.redi-rock.com)

# IMPORTANT NOTICE

The design specifications for Redi-Rock blocks suggest maximum installation heights under certain assumed conditions. These wall heights were calculated using the assumed material properties and loading conditions in The Design Resource Manual and will vary from location to location depending on the soil properties and terrain. Since soil conditions and topography vary greatly from site to site an engineering analysis must be performed for each wall installation.

Because Redi-Rock International does not build the blocks or install the wall system, Redi-Rock International does not assume any responsibility regarding structural stability of any particular blocks or particular wall system. In addition, Redi-Rock International assumes no responsibility in connection with any injury, death or property damage claim whatsoever whether asserted against a Lessee, Lessor, Purchaser or others, arising out of or attributable to the operation of or products produced with Redi-Rock International equipment.