RCB Request Form 2025

The Reinforced Concrete Box/Ridgid Frame Box (RCB/RFB) program request application has had two request versions, an internal Visual Basic 6 (VB6) version and an external KART child web-app. Also, it has a MicroStation Visual Basic application (mvba) driven by VB6 for the CADD generation. Moving the CADD to a 64-bit version disrupted the VB6 driven process and provided the opportunity to consolidate the two requests into a single request app.

KART Development Link: https://devnet/KART/default.aspx

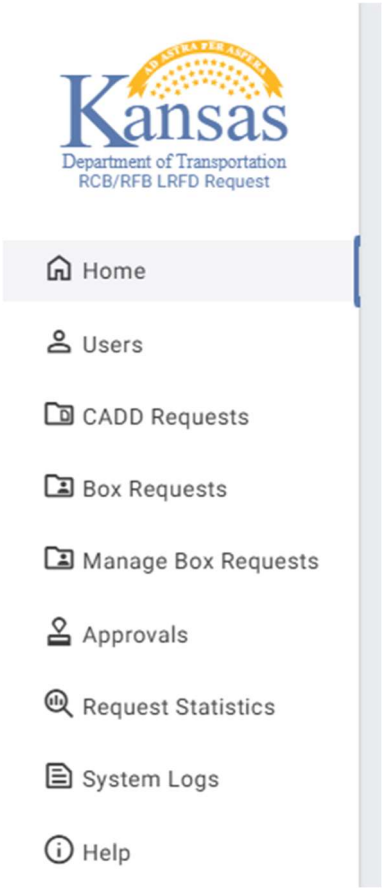
KART Production Link: https://kart.ksdot.gov/RCB_LRFD/

Updated Version Changes

- MicroStation 64bit support.
- Database driven input instead of *.rce files.
- Angular web front end with Tailwind CSS plus a WebAPI.
- CADD generation updated from a mvba to a C# MicroStation Add-in application that can monitor and execute requests by schedule.
- Import options from past requests is available.
    - Direct *.rce file import
    - Classic CADD requests (CADD-generated requests that were database captured by VB6 can be accessed and imported if needed – will need a role to see these)
- Copy existing request feature.
- Bid quantity quarter costs integration and finer cost category details.
- Quantity engine has moved from VB6/VB.NET to C#.
- Independent state management to track CADD approval and CADD generation progress.
- The approval process is now web based.
- More automated email notifications to report request events.
- Request Search feature that searches all fields simultaneously or by using the triangle dropdown, it can search specific fields.

Menu Items

Menu Items are visible based on [role name(s)] and perform in the following ways listed below. All users have the Requestor role. Note: further roles in the Angular code or API are involved in page actions.



Users [Developer, Administrator]
See RCB User table and assign role permissions for other Users.

CADD Requests [Developer]
View of the legacy CADD requests that were captured from the Generate CADD button in the previous VB6 app. The page also provides a Detail view and copy potential (though the screen capture at left has some old and new missing inputs).

Box Requests [Viewer, Requestor]
Lists saved box requests for user (Requestor) or system wide requests (for Developer, Administrator, Engineer, Viewer roles). Also, the page can be used to start a new request or upload a copy of a classic request (*.rce) input file.

Manage Box Requests [Developer, Administrator, Engineer, kdotProjectManager]
Access to Manage Box Requests page which is further sub tabbed to All (literally), Assigned (all requests assigned to me), and Requested (my requests) tabs.

Approvals [Developer, Administrator, Engineer, kdotProjectManager]
Short list of box requests that have requested CADD use and are awaiting approval.

Request Statistics [Developer]
View various statistics on box requests with filterable date range.

System Logs [Developer]
View any information or error logs that have been captured or created.

Help [no role needed]
Help page that mostly covers the box request process and progression.

VB6 vs Web - General Differences

Cell Config Input

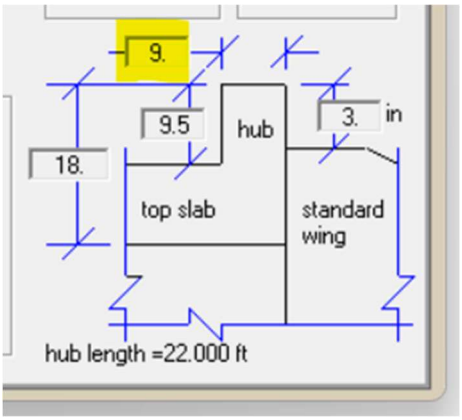
For those within KDOT who have only used the VB6 program, the Web version has a different input approach. One example is that the available cell configuration variables (Design Type Fixed or Pinned, Number of Cells, Cell Span, and Cell Height) were individual inputs in the VB6 version. Whereas, on the Web version, an availability matrix table is generated which allows you to select all those inputs at once, short circuiting the prior frustration of having to guess their availability.

Less Inputs Required for Report

The other main difference would be input requirements. The VB6 version required all inputs to be selected before generating either the report with a summary of details and costs, or the CADD Drawings. The Web version has organized only the inputs that are necessary for a detail/cost summary in its early tabs, deferring inputs that would be needed for generating CADD details to the later "Plan Info" tab. This allows a summary of detail/cost investigations to be accomplished quickly.

Hubguard Info

One UI difference a previous VB6-only user may need to be aware of is that the live diagram of the hub, which would be typically used in roadway calculations, is not on the Web version.



The Plan Info tab's roadway inputs will not have a diagram, but reports the hubguard width for the current request. The summary tab also explains how the value of the width is determined for any box.

The new request has a Calculate Roadway button that will automatically take into account the actual hubguard width. The Calculate Roadway button does not account for horizontal curves if present.

Fill Height

The input for fill height from a VB6 user has been a text box. So, a user could enter a non-standard fill height (i.e., 2.5) and the program would round up or down as appropriate. In the new app the fill height is a dropdown box of only the standard fill heights for the current cell config. For a low fill (0 to 5' range) the program can still auto-select the most conservative design of the typically available standard 0, 2, 3, or 5' fills. The "Autofill" option is located on the summary tab if a user desires to

override the auto behavior. The override decision is saved per request. The past VB6 override option was only a runtime option that did not persist with any input saving.

Low Fill with No Epoxy

The VB6 program warned the user if they had a user fill of 2' or less without Epoxy selected. The Web version currently does not include a warning for this combination. Evaluating whether to opt out of Epoxy should be kept in mind for applicability. The top clearance used in the design standards on low fills assumes Epoxy has been selected/used for the top slab. If salts/high volume concerns do not exist, opting out of Epoxy without making adjustments could be valid. If salts do exist, either a wearing surface addition in the plan notes would be warranted, or using Epoxy should be required. The Web version includes the following language to guide Requestors:

"KDOT policy is to use air-entrained concrete and epoxy rebars on at-grade boxes or when the fill height is 2' or less measured at the outside edge of shoulder-line. This is not required on unsurfaced, low-volume roads or on RCB extensions in non-urban areas."

KDOT Project Managers

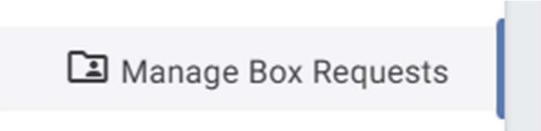
In the past, an email was generated with the attached *.rce file used by the VB6 program as input. Again, you will receive email for an external request, and instead of an attached input the email will have a link to the app where you may "Review/Approve" the request.

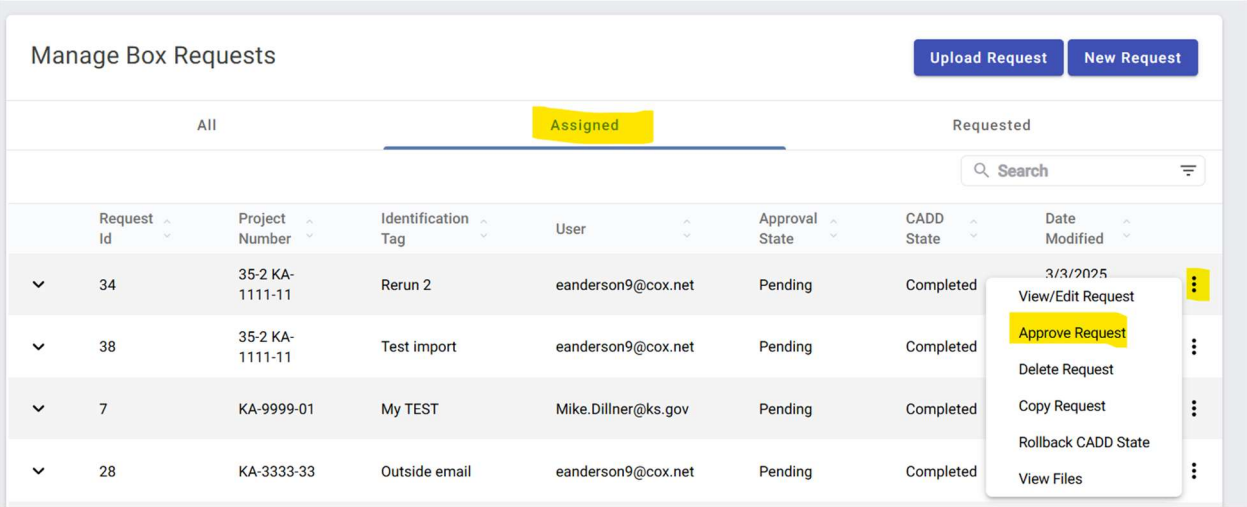
This will take you directly to a page that compiles all the request input fields into a single page with buttons which allow for approving or rejecting with comments. The token management may at times revert you to the KART home or the request app home instead of the related page.

The email will also have a "View/Edit" link if you want to look at an input in the full request form multi-tab context. In multi-tab view it should be noted that the ability to approve will not be available.

If not starting from the Review/Approve email link, the requests designated for you to approve will be found either in the "Approvals" main menu item, which, at a minimum, provides the requests where you were tagged as Project Manager (note: it may show more, depending on your role), or on the "Manage Box Request" main menu item (rather than the "Assigned" tab).

Manage Box Requests Main Menu





The Manage Box Requests (access is role based, so your options may differ from the above example image) the left side bar tab will give 3 in-page tabs, the “Assigned” tab would be the requests for which you have been tagged as the Approver. The triple dot menu on the right side of each request row manages Viewing and Approving functions. The “Approve Request” function is not a one click operation.

Tabs

All – Tab visible for Developer, Administrator, Engineer, or Viewer roles. Requests listed are for any approval and CADD program state.

Assigned – Tab always shown. Lists requests where the assigned Project Managers contains the logged in email address and where the request author is not the current user. There is no filtering on approval or CADD states, merely lists all the requests that have been assigned to you.

Requested – Tab always shown. Lists requests by the current user. There is no filtering on approval or CADD states. Similar in content to the main menu “Box Requests,” but with more menu item management. This is currently the only place to delete box requests or reset the CADD state.

Menu Items

View/Edit Request – Goes to a detail view of the request in full multi-tab request form context. For the request to open in edit mode, one of the following three must be true:
1. CanEditAll -> Have one of Developer or Admin roles and the CADD approval state must be pending or updateInProgress.

2. CanEditOwn -> Have one of Developer, Administrator, Engineer, kdotProjectManager, or Requestor roles and be the request owner and the CADD approval state must be noCADDRequest or correctionRequest

3. CanEditAssign -> Have one of Developer, Administrator, Engineer, kdotProjectManager roles and have the request management assigned to you and the CADD approval state must be pending or updateInProgress

A generalized behavior recap may be “Admins” and “Users” are somewhat inverse on edit access during various CADD approval states. Users can edit before submitting or during correction requests while Admins cannot. “Admins” can edit once submitted while users lose edit access, unless the Project Manager rejects than edit access is reversed again. In the end once approved, no one can edit.

Approve Request – Goes to the Request Approve page for summary review and final Approve or Reject actions.

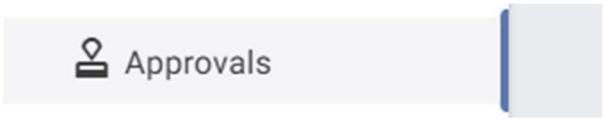
Copy Request - Make a copy of the request resetting certain fields (e.g., CADDApprovalState, projectManagers). This is limited to a list of roles but one is Requestor, so essentially everyone can.

Delete Request - Delete’s request. The menu item will not be available if the CADD State is “Processing” for a particular request. The deleting is a soft delete. The record will remain existing but be marked as not Active and be filtered out of most request returns. Currently requires Developer or Administrator role.

Rollback CADD State - Reverts the CADD program state to “Pending”, clearing CADDGenerationException and CADDGenerationFailureCount, which would invoke CADD regeneration. This has been largely a testing feature and would not be part of a typical workflow.

View Files – Lists the files and provides download opportunity.

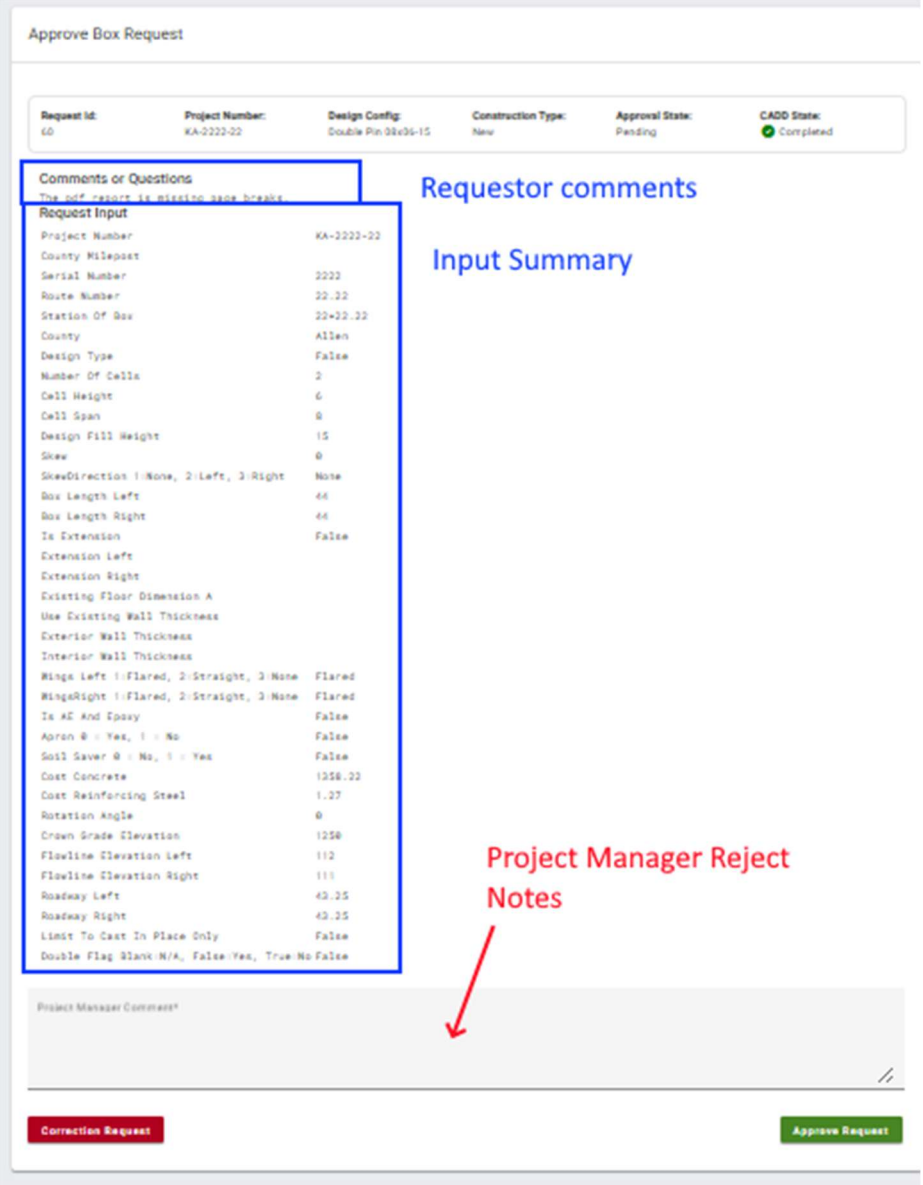
Approvals Main Menu



Contrasted to “Manage Box Requests,” the “Approvals” will have only one table dedicated to listing requests that are in the pending approval state. If you are in the Developer or Administrator role, all pending approvals are returned, otherwise the pending approval requests are farther filtered by needing to be assigned to the current user using an email address match within the ProjectManagers field.

Approve Box Request Page

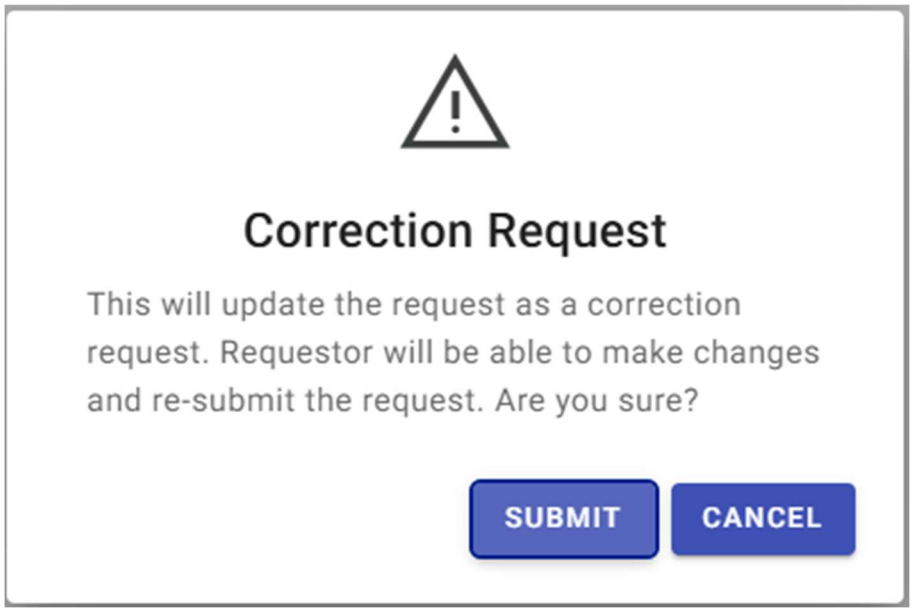
The Project Manager can optionally wait to approve the request if desiring to review the CADD dgns first. The original request email will be followed by another email when the CADD is completed. An input review only would be possible also. Approval and CADD generation are independent processes though both would be required for an external user to view and download the files.



The Approve screen recaps the inputs into a single page and gives a chance to approve or make notes and reject the request back to the request author if something needs to be updated or needs additional consideration. After the Requestor receives the automated reject email and makes changes, they can request CADD again. After re-requesting CADD, the original review comments will be emailed to the Project Manager for reference along with a link to return. This loop of user requesting CADD and Project Manager rejecting can be repeated if needed.

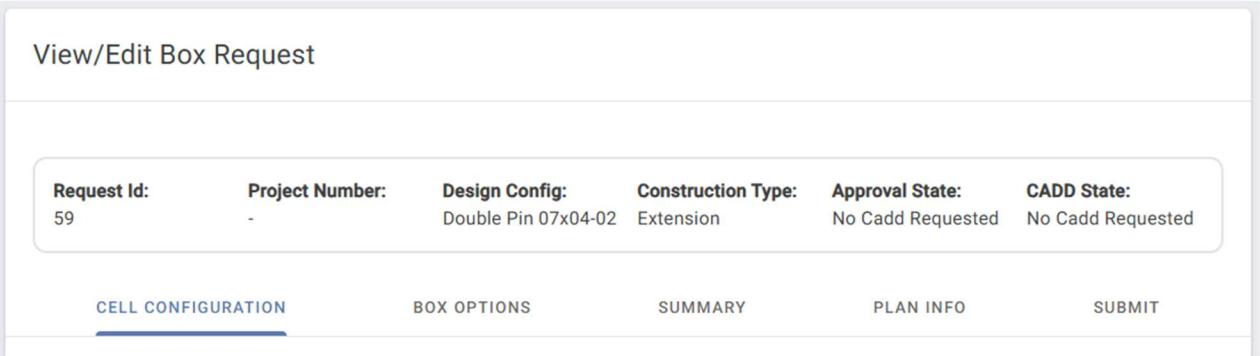
Any correction editing must be performed by the original requestor as the Project Manager has read-only access once rejected. When a CADD Request has been submitted, the original requestor's access to it is set to read-only, but during the reject process, their read-only access is unlocked.

Correction Request confirmation dialog:



Request Entry Notes

When entering box input the following tab progression exists.



Cell Configuration Tab

This lists the availability of standard designs along with the maximum fill height per configuration. If a fill height or design configuration is not shown, a custom design and detail would need pursued.

Box Options Tab

Here you will finish entering the design criteria based on the current Cell Config settings. The input finished here will provide the RCB engine with enough information to calculate quantities and costs.

Summary Tab

This tab can provide a quantity and cost summary.

The material costs can use the auto-populated KDOT quarterly bid-item data or be overwritten as necessary. The County dropdown field will list all the counties and the related wage area which is the actual connection to bid item data. The first county is “All Counties (Wage Area 0)”. This would be a state-wide average if preferred or if a particular county has no recent data.

The Summary tab is the current home to calculate a summary and cost report that is downloadable as a .pdf. Each request from the main menu’s Box Requests page has a “View Files” link. That link result does not currently include this .pdf file. The .pdf file may need to be regenerated after entering the following Plan Info.

Plan Info Tab

The provided data that will be inserted into CADD Details as text and help route a request.

The current project types are:

- State or Federal – State or Federal projects managed by a KDOT Project Manager
- County or City – for Local Projects with less required inputs and a fixed KDOT Project Manager.
- KTA – for the Kansas Turnpike Association also with a fixed KDOT Project Manager.
- PMC – For State/Federal projects managed by a Project Manager Consultant (stand-in KDOT administrators).
- Other – requests outside of Kansas, etc.

The Project Type on the Plan Info tab will adjust what inputs are required (i.e., Serial Number and State Reference) as well as filter the appropriate Project Manager options when arriving at the Submit tab. The Box Classification (Bridge|10 to 20'|Road Culvert) which is auto-determined by geometry will also manage the visibility of some inputs.

Rotation and Skew are intended to be the same in most scenarios. The wing geometry will be affected by the fixed skew permutations 0|30|45. The rotation could be used as a tool to cover in-between channel alignments though it makes the hubguard out of parallel with the roadway. The rotation does not affect quantities but does affect the roadway calculation.

The roadway inputs can now be auto-calculated. To avoid an error, it requires the Rotation on the same tab to be specified first. This calculation will ensure the box lengths, hubguards, wall thicknesses, skew and rotation, and roadway lengths are all in agreement on the plans. The auto roadway calculator is not applicable for horizontal curve scenarios.

Submit Tab

It is only necessary to submit if CADD details are being pursued.

When CADD is requested as an internal user (@ks.gov KART account) the approval is automatic. For external users a CADD request will queue the dgns to be created without waiting and initiate a request for approval. Once approved, the files will be available as soon as they are both generated and approved. Currently the routed Project Manager email must be in the list to ensure a KART designee with appropriate roles for approval.