AID Coding Challenge

Please return a production level code along with a short description of your solution that solves the problem below.

The work will be judged on:

- Overall presentation of the solution
- Algorithm choice
- Overall software organization/architecture
- Coding style, code efficiency, code readability, and proper usage of C++
- Efficiency: both CPU performance and RAM consumption are considered

Please note that in the event you find stuff you think should be cleaned up in the boilerplate code, don't hesitate to do so should you find time!

With that, good luck and have fun!

Imagine you're waking up on the beach of an island. You have no idea where you are. Oh, but wait, now you remember. It's your wedding day. And you had a terrible bachelor's party. You need to get to the wedding like yesterday… You find a remote control to your Audi Rover (tm) in your pocket by which you can summon your rover to your location, and then take you in the shortest possible time to the actual wedding.

Your task is to find the fastest route you can by which the rover (located at `ROVER_X`, `ROVER_Y` on the map) is summoned to your location (`BACHELOR_X`, `BACHELOR_Y`), and sent to the wedding (`WEDDING_X`, `WEDDING_Y`), subject to some constraints. You are to visualize the taken path using the BMP file writer included with the file package. Please provide the time the planned path will take and also explain your model choices (see below).

Some definitions:

- There are 2 files available containing elevation (0-255) over the ground (`elevation.data`) and terrain flag bitmasks (`overrides.data`).
- Here is some useful information about the bitmap values:
    1. Rivers and marsh have bit 4 set.
    2. Water basins have bit 6 set.
- These files contain 2048x2048 8-bit byte values with each row's columns stored in consecutive order with no row padding.

Interesting left-top (x, y) coordinates:

- The rover is located at 159, 1520.
- The bachelor is located at 1303, 85.
- The wedding is taking place at 1577, 1294.

Constraints:

- The rover's normal speed is 1 cell per island second. It can move straight (taking 1 island second) and also diagonally (taking sqrt(2) island seconds).
- The rover cannot swim, nor can it crawl marshes.
- The rover's speed is lower uphill. **It's part of the task to model in which way it becomes slower.**
- The rover's speed gets higher when running downhill. **It's part of the task to model in which way it becomes faster.**