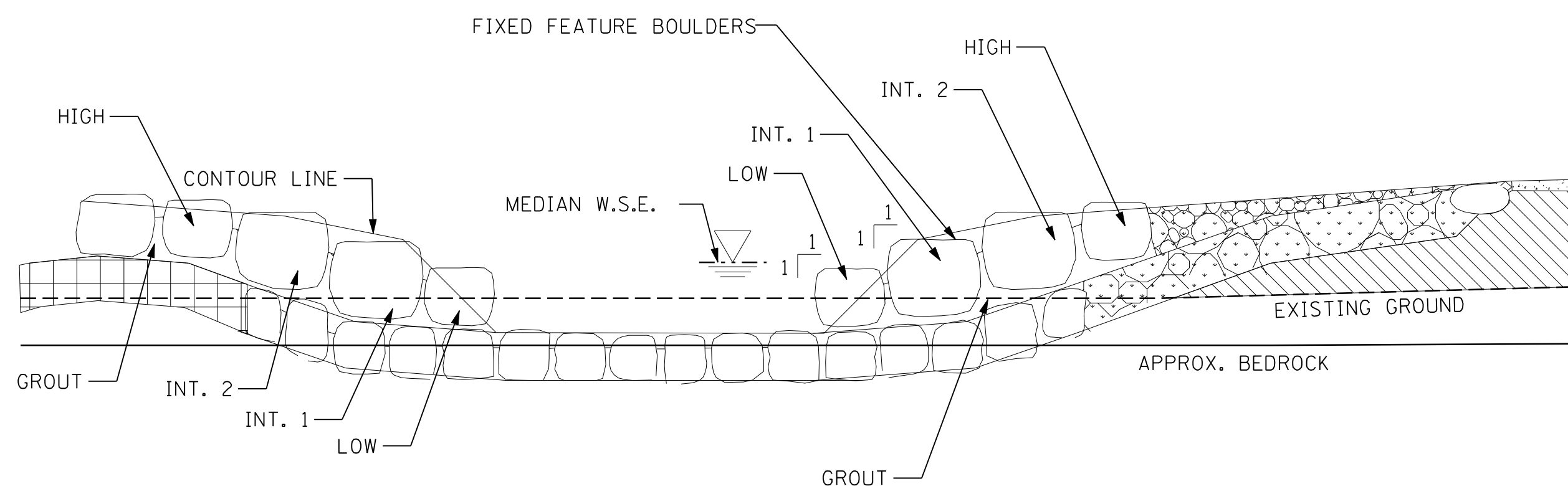


LOOSE FEATURE BOULDERS ARE TO BE SET AS SHOWN OR DIRECTED. IF FLOW SPLIT OR WATER LEVEL ADJUSTMENT NECESSARY DURING TESTING LOOSE BOULDERS TO BE MOVED INTO STREAM. CHINK AND FILL ALL VOIDS WITH STONE RIPRAP - CLASS A5 OR AS NECESSARY

ADJUSTABLE FEATURE BOULDER PLACEMENT DETAIL

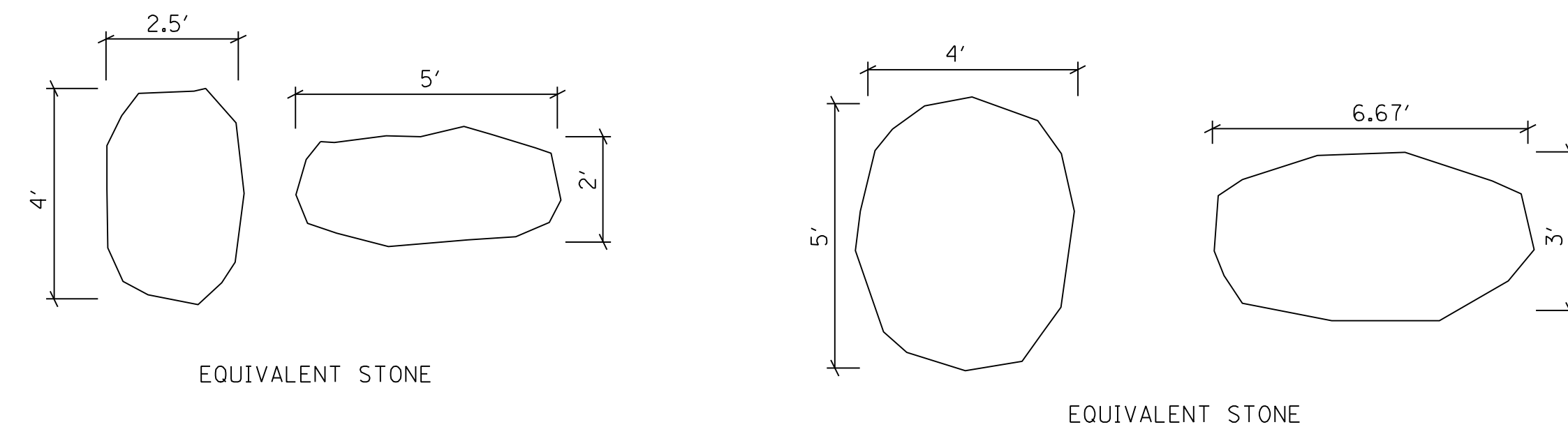


FIXED FEATURE BOULDER PLACEMENT DETAIL

FEATURE BOULDER NOTES

1. Feature Boulders are for a number of purposes such as hydraulic controls and their adjustment, whitewater features such as waves and eddys, habitat, and appearance.
2. Details on the drawings and specifications apply to the construction and placement of Feature Boulders. Specific references to details or specifications do not exclude other general details and specifications.
3. This drawing depicts general requirements and details of combination features. Other Feature Boulder details are with Grouted Boulder, Riprap Special and miss. detail drawings. The detail (E drawings) and general sections (DX drawings), and profiles (C1-C4 drawings) do not depict the Feature Boulders.
4. The Feature Boulder Plans depict the general location and identify each Feature Boulder Cluster (FBC). Exact placement of boulders for appearance, material supply, sitting, walking is not critical so long as related requirements are met (general orientation, level related to path and structures, etc.). Fixed Feature Boulder for controls such as weirs, entrances to waterways, constrictions and sills have more specific elevations and placement requirements. Loose Feature Boulders are inherently adjustable and their data is for initial setting.
5. The following drawings present tables giving data about each FBC including location, key purposes, numbers, types, elevations, accessory riprap needs, comments, and reference to key related details.
6. All Feature Boulders will be the same as that used for the Grouted Boulders. No substitution of rock from other supplies will be allowed. The intent is to select specific boulders from the approved supply delivered, so long as the requirements and intent of the design is satisfied.
7. The size of boulders is given on the table. There is latitude as to the size provided. The values given are the plan view horizontal dimensions. The boulders provided may be six inches smaller in either axis for up to 15 s.f. and 1 foot smaller in either axis for boulders greater than 15 s.f., so long as the area is equal to or exceeds that of the specified dimensions (e.g. the requirement for a 2.5 by 4 ft boulder may be satisfied by a boulder which is 2 by 5 ft; or a 4 by 5 ft boulder may be satisfied by a 3 by 6.66 ft. See Boulder Plan View Example below.) The vertical axis will generally be less than or equal to the smallest horizontal dimension, and suitable to the particular situation. The boulders are to be selected and matched to the other boulders in the cluster and the situation.
8. In some cases, a lesser number of larger boulders may be substituted as may be approved or indicated, in particular boulders for walls, appearance or certain hydraulic controls. The substrate may be lowered, as may be approved. To allow for vertical heights of boulders (loose boulders over Riprap Special or Grouted Boulders). The ratio of the largest dimension to the smallest will not exceed 3 except as approved or directed.
9. Fixed Feature Boulders are to be placed with the regular Grouted Boulders in the orientation and elevation indicated. The contractor will review the intent of each cluster with the engineer in advance of placement.
10. Loose Feature Boulders are to be placed in two types of situations: in Riprap or Riprap Special, and on Grouted Boulders. Either can be used to adjust hydraulic controls. Loose Feature Boulders on or adjacent to Grouted Boulders will be placed after the grout has set for 2 weeks minimum or otherwise judged by the engineer to be satisfactory to allow loose boulder placement. Feature Boulders may be placed with Riprap construction as it proceeds. Placement of loose boulders will be observed by the engineer typically after initial construction, coordinated with other observations of Grouted Boulders or various work. Adjustments will be made by the contractor as directed by the engineer.
11. Loose Feature Boulders may be reset or adjusted at latter times, such as after or during flow tests.
12. In order to achieve the various purposes above, Feature Boulders typically project above the design topography and into flow. Thus the profile, shapes and combination surface roughness can potentially create debris catchers, hazards, and other problems. The drawings indicate measures and materials which can prevent or minimize such conditions. The contractor will select and match Feature Boulders, and place clusters which comply with details, specifications, and directions of the engineer.

BOULDER PLAN VIEW EXAMPLE



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