Message Id	Typical message (may vary slightly)	Message intent	Response
CV PW 01 BR LW 01 BR PW 01 CV PW 01 CV LW 01	This is ($strucname$). The selected profile is $profilename$. Type of flow is pressure and weir flow because, 1. EGEL 3 of $egel3$ is greater than MinTopRd of $Min_El_Weir_Flow$. 2. EGEL 3 of $egel3$ is greater than MxLoCdU of $MxLoCdU$.	Clarify flow type	No response needed. cHECk-RAS is simply reporting the flow type.
NT RC 01L NT RC 01R NT RC 03 XS CD 02 NT RC 05	All of the left overbank Manning's "n" values are less than 0.030. The "n" values for the overbank areas are usually larger than 0.030 (Chow, 1959, page 113). The "n" value(s) should be reevaluated.	Check n-values	Manning's n values were created based on actual conditions. Note that in Arizona, it is often the channel that has more vegetation than other areas as it is the only area with water. N values were reviewed and determined to be acceptable as-is.
NT RS 02BUC NT RS 01S2C NT RS 02BDC NT RS 02BUC	This is the Upstream Bridge Section (BRU). The channel n value of $chlup$ for the upstream internal bridge opening section is equal to or larger than the channel n value of $chl3$ at Section 3. Usually, the channel n value of the bridge opening section represents the area below the bridge deck and is less than the channel "n" value of Section 3	Check n-values	Manning's n values were created based on actual conditions. Note that in Arizona, it is often the channel that has more vegetation than other areas as it is the only area with water. N values were reviewed and determined to be acceptable as-is. Additionally, urban areas may have smooth types of pavement that have a lower n value.
ST DT 03	This is ($Structure$) section. The Contraction Length is longer than the Expansion Length. Section 4 channel distance of $Length_Chnl4$ is longer than Section 2 channel distance of $Length_Chnl2$. Section 4 and Section 1 should be relocated.	Cross section placemenet at structures should be examined	Cross section placement was examined and determined acceptable as-is. Other factors may influence the placment of cross setions.
ST GD 01US	This is ($strucname$) Section. The road data is outside the ground data. The starting station of $rdstal$ from upstream Road data is less than the starting station of $stal$ from the upstream internal section. The $profilename$ flood EGEL of $egel3$ at Section 3 is higher than the ground elevation of the starting GR station and lower than the high chord elevation of the starting Road station. The road data should be included in the ground data.	Road data should be checked against ground data	The data as entered is acceptable.
ST GD 02BU	This is the Upstream Bridge Section. There is only one bridge. However, the low cord line crosses the ground line at more than two locations. The ground and deck/roadway data should be checked.	Check the bridge low chord compared to the ground	The low chord of the bridge may touch rock outcroppings and is acceptable as is.
ST GD 03S3 ST GD 04S3	This is Section 3. The highest flood frequency that has weir flow is $profilename$. All the ineffective flow elevations at Section 3 are lower than the water-surface elevation at Section 3.	Check the ineffective flow elevations	Ineffective areas are warranted by a number of factors, not just at culverts. Placement of ineffective areas was examined and determined to be acceptable as is.
ST IF 02S2L ST IF 02S2R ST IF 02S3L ST IF 02S3R	This is Section 2. The selected profile is $profilename$. Weir flow occurs at	Check the ineffective flow elevations	Ineffective areas are warranted by a number of factors, not just at culverts. Placement of ineffective areas was examined and determined to be acceptable as is.

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ST IF 03S2L ST IF 03S3L ST IF 04S2L ST IF 04S3L (etc)	($strucname$). However, left (or right) ineffective flow station was not considered at Section 2. The ineffective flow station and elevation should be inserted. The left ineffective flow elevation should be less than the wsel2 of $wsel$ of the $profilename$ profile.		
ST IF 10S2R ST IF 10S3R	This is Section 2 of a ($Structure$). More than one set of Right Ineffective Flow Stations were considered. There is only one structure at this location. Multiple Block Ineffective Flow option should not be used unless the area blocked by the ineffective flow stations can be considered Non conveyence	Check the ineffective flow elevations	Ineffective areas are warranted by a number of factors, not just at culverts. Placement of ineffective areas was examined and determined to be acceptable as is.
ST DT 01B ST DT 02C ST DT 02B	'Upstream Dist' of $distup$ in "Bridge Width Table" is less than the height of the bridge opening of $height$. This indicates that Section 3 may not be placed at the foot of the road embankment or wing walls and may not represent the natural valley cross section. Section 3 should be relocated or provide a statement that it represents the natural valley cross section.	Cross section placemenet at structures should be examined	Cross section placement is acceptable as-is. Cross section placement at structures and the terrain near structures may be variable and based on a number of factors.
XS CD 01	Critical Depth occurs at $assignedname$ flood. Flow Code will be "C". The Ineffective flow option is used. The Ineffective Flow elevation is equal to or higher than the Critical WSEL. Please investigate whether this selection is appropriate.	Check ineffective flow selections	Ineffective areas are warranted by a number of factors, not just at culverts. Placement of ineffective areas was examined and determined to be acceptable as is.
XS IF 02L XS IF 01L XS IF 01R	Flow code will be MIL. Multiple (block) Ineffective Stations are selected for the left overbank at this River Station. This is not Section 2 or Section 3 of Multiple Openings or Multiple Culverts. Please explain why the multiple blocks ineffective flow option was used. Consider using the normal ineffective flow option.	Check ineffective flow selections	Ineffective areas are warranted by a number of factors, not just at culverts. Placement of ineffective areas was examined and determined to be acceptable as is.
XS DF 01R	Divided flow. Flow code will be DR The $assignedname$ flood discharge has a divided flow. The starting and ending stations of the cross section should not extend beyond the watershed boundary of the studied stream. Please review the extent of the cross section.	Check divided flow areas	These areas were examined and determined to be acceptable as is, and represent minor high points in the terrain.
XS DC 02	Constant discharge used for the entire profile for $assignedname$ flood. At least two discharges should be selected; one at the mouth and	Check to see if flow should vary or is one flow ok	For very short streams and tributaries, one constrant discharge is appropriate. Not change necessary.

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	the other at the middle of the watershed or above the confluence of a tributary. Or provide explanation why only one discharge should be used. Other flood frequencies should also be checked.		
FW ST 03BUL FW ST 03BUR FW ST 03BDL	This is ($strucname$) Upstream Internal Section. The left encroachment station is within the structure opening area. The left station effective of $ineffstal$ for the 1-percentannual-chance profile is less than the left abutment station of $abutstal$. The 1-percent-annual-chance floodplain is outside the structure opening. The left encroachment station of $encstal$ is greater than the left abutment station of $abutstal$. Enc_Sta_L should be relocated outside of the structure opening area.	Check FW encroachment stations compared to structures.	The encroachments were examined and determined acceptable as-is. For culverts with extreme skew, the internal cross sections may generate these errors but are automatically generated.
FW SW 04M1	Encroachment Method 1 is used. The total conveyance for the 1%-annual-chance flood profile is $convtotalna$. The total conveyance for the floodway profile is $convtotalfw$. The difference in conveyance between the floodway profile and the 1%-annual-chance flood profile is more than 1%. The Normal Depth option with the same energy slope as the 1%-annual-chance flood profile must be used for both the 1%-annualchance flood profile and the floodway profile and the plan should be rerun.	Check encroachment	The encroachments were examined and determined acceptable as-is.
MS MO 01C	However, multiple culverts or combination of bridges and culverts are modeled at this section. Multiple Opening Analysis must be selected from the Bridge Culvert Data window to analyze the structures properly. Multiple Openings Analysis is explained on page 5-1 of the Applications Guide (HEC, 2010).	Use multiple openings analysis if warranted	The structure analysis was examined and determined acceptable as-is.
XS DC 03	Discharge is different between the upstream side and downstream side of the structure for $assignedname$ flood. They should be the same.	Check flow input locations	Ok as is. Side tributary flow enters and/or diversion due to overtopping occurs.
NT TL 02	Contraction and expansion loss coefficients are cc and ce, respectively. However, this cross section is not at a hydraulic structure. They should be equal to 0.1 and 0.3 according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	Check selection of expansion and contraction coefficients	contraction and expansion coefficients are increased for two cross setions up and one cross setion down from structures.
CV CF 02	This is ($strucname$). Culvert Chart # is $chart$ and		The HEC RAS library of culverts occasionally does not have the correct combination of

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	Scale # is $scale$. Culvert entrance shape is $shape$. Culvert entrance loss coefficient is $inputentlosscoef$. It should be equal to $entlosscoef$.		pipe materials and shapes, so a close type is chosen, and the entrance loss coefficients and materials may require non-standard values
CV CF 03	This is ($strucname$). Type of material is $material$. Culvert n-value is $nculv$. Culvert n-value is not within the recommended range. It should be within $nculv1$ and $nculv2$.		The HEC RAS library of culverts occasionally does not have the correct combination of pipe materials and shapes, so a close type is chosen, and the entrance loss coefficients and materials may require non-standard values
XS LC 01 XS SP 01	LenChl Up/TopWdthAct Dn = $ratioVal$. The ratio is more than 1.1. LenChlUp is more than 500 feet. This cross section is located too far upstream from the critical depth cross section $secnocritical$ for the $Assigned_Name$ flood. The cross section should move closer to the critical depth section, or an additional cross section should be added between the two cross sections.	Check cross section placement	Cross section placement is acceptable as-is. Steep streams often generate this warning when additional cross setions may not be necessary.