WAIKATO COAL MEASURES: Sub-bituminous coal seams grading into impure coal interbedded with purplish black faintly bedded to massive carbonaceous mudstone, rare resistant ironstone lenses and concretions.

**Massive Mudstone:** Medium grey weathering into light yellow florescence, occ. with slight greenish tinge, soft and sticky, non-calc., occ. carbonaceous streaks and ironstone concretions, shell casts seen in places, slumping com.

**Glauconitic Sandstone:** Dull greenish grey, weakly to mod. cemented, fine glauconitic sandstone often interbedded with purplish grey mudstone, common iron stone concretions, rare burrows infilled with glauconitic sst.

**Massive Siltstone:** Medium to dark grey, frequently weathers to purplish brown, soft and crumbly, non-calcareous, common thin iron stained veinlets.

**Glauconitic Sandstone:** Dull greenish grey, weakly to mod. cemented, fine glauconitic sandstone often interbedded with purplish grey mudstone, common iron stone concretions, rare burrows infilled with glauconitic sst.

**Massive Mudstone:** Medium grey weathering into light yellow florescence, occ. with slight greenish tinge, soft and sticky, non-calc., occ. carbonaceous streaks and ironstone concretions, shell casts seen in places, slumping com.

**WAIKATO COAL MEASURES:** Sub-bituminous coal seams grading into impure coal interbedded with purplish black faintly bedded to massive carbonaceous mudstone, rare resistant ironstone lenses and concretions.
### Stratigraphic Column No: TA-17

**Region:** Te Akau  
**Location:** Dunphail Bluff, Elgood Road

**NZMS 260 Sheet:** S14/939936

**Grid Reference:**  
**E:** 2693952  
**N:** 6393645

**Author:** A. Tripathi

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<th>Scale (metres)</th>
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- **Top eroded**
- **Siltstone:** Dark grey weathers to an ochre-brown to purplish brown frittered surface, often with yellowish florescence, soft and sticky, predominantly non-carbonaceous, weakly to mod. calc. when shells are present, thin iron stained veins, and cross the exposure surface, unit shows common slumping.
- **Calcereous Silstone:** Light to medium brownish grey, well cemented, massive in appearance but faint centimeter scale horizontal bedding evident in the middle and upper part, bioturbated, very fine to fine calc. silt grading into silty sandstone to sandy siltstone, steep weathering profile, scattered articulated and disarticulated pectins.
- **Calcereous Silty Sandstone:** Light to medium brownish grey, well cemented, massive in appearance but faint centimeter scale horizontal bedding evident in the middle and upper part, bioturbated, very fine to fine calc. silt grading into silty sandstone to sandy siltstone, steep weathering profile, scattered articulated and disarticulated pectins.
- **Massive Calcereous Silty Sandstone:** Light brownish grey, frittered weathering surface, well cemented, common mottled texture due to extensive bioturbation, disseminated fine glauconite pellets especially in the basal part, occ. articulated pectins, often highly leached.
- **Flaggy Glauconitic Limestone:** Light brownish, flaggy with irregular, bifurcating seams rich in siliciclastics, highly fossiliferous containing large bivalve fragments, disseminated glauconite pellets, medium to coarse grainstone.
- **Sandy Glauconitic Limestone:** Massive, dull greenish grey, mod. well cemented, medium to coarse grainstone, large bivalve infilled with glauconitic sand seen in the basal part, large bivalve fragments, poorly exposed.

**Photo No:**
- 3-3252  
- 3-3253  
- 3-3254  
- 3-3255  
- 3-3256  
- 3-3257  
- 3-3258  
- 3-3259  
- 3-3260  
- 3-3261  
- 3-3262  
- 3-3263  
- 3-3264  
- 3-3265  

**Author:** A. Tripathi
### Description

**INTERBEDDED SANDY MUDSTONE AND CALC. MUDDY SANDSTONE:** Medium dull greyish, alteration of weakly cemented massive sandy mudstone and 15-20 cm mod. cemented calcareous muddy sandstone, fossiliferous with abundant often leached bivalves, *dentalium*, oyster fragments and gastropods.

**FLAGGY LIMESTONE:** Light brownish to greyish white, lowermost 1-1.2 m interval above the contact is mass., grades upsection into poor to mod. flaggy, flags 6-10 cm separated by thin recessive seams, horizontally bedded fine to medium sparry grainstone to packstone, common scattered whole bivalves and coarse shell hash mainly of *pectins*, especially in the upper transition to interbedded calc. siltstone and lst, common disseminated glauconite pellets.

**GLAUC. CALC. SILTSTONE:** Dull greenish grey, mod. cemented, massive often with frittered surface, fine calc. siltstone with high concentration of glauconite, grades above into weakly to mod. glauconitic calc. siltstone.

**MASSIVE CALC. SILTSTONE:** Light greyish to bluish grey, massive, fine siltstone, highly calcareous, mod. glauconitic in places.

**GLAUC. CALC. SILTY SANDSTONE:** Light brownish to bluish grey, well cemented, overall massive in appearance, however over massive interval faint horizontal bedding is often discernible from weathering breaks and occasional honey-combed intervals, bluffy near vertical weathering profile, highly calcareous very fine to fine sandstone grading into siltic sandstone, bioturbated, rare scattered bivalves.

**INTERBEDDED GLAUCONITIC LIMESTONE & MASSIVE CALC. SILTSTONE:** Dull brownish grey to greenish grey, alteration of 20-30 cm highly glauconitic limestone and massive glauconitic siltstone, common scattered *pectins*.

**CALC. Silty SANDSTONE:** Light brownish to bluish grey, well cemented, overall massive in appearance, however over massive interval faint horizontal bedding is often discernible from weathering breaks and occasional honey-combed intervals, bluffy near vertical weathering profile, highly calcareous very fine to fine sandstone grading into siltic sandstone, bioturbated, rare scattered bivalves.

**MASSIVE SANDY MUDSTONE:** Dull medium greyish, weakly cemented, crumbly and sticky when wet, massive with only faint horizontal bedding apparent in places, scattered leached bivalves, gastropod and *dentalium*.

**Lower contact of the unit not exposed.**
### Stratigraphic Column No: Ak-15  
**Region:** Whatawhata  
**Location:** Quarry Road, Te Pahu-Karamu, Whatawhata  
**NZMS 260 Sheet:** S15/919648  
**Grid Reference:** E: 2691961  
**N:** 6364878

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**Grid Reference:**  
*E: 2691961  
N: 6364878*

**Region:** Whatawhata  
**Location:** Quarry Road, Te Pahu-Karamu, Whatawhata  
**NZMS 260 Sheet:** S15/919648

**CALCAREOUS SILTY SANDSTONE:** Light bluish to brownish grey, well cemented, overall massive in appearance but faint bedding is apparent from bedding parallel recessive horizons, extensively bioturbated, prominent bluffy near vertical profile.

**CALCAREOUS SILTSTONE:** Light greyish to brownish grey, massive with frittered weathering surface, fine calcareous siltstone, unit is poorly exposed.

**MASSIVE TO MOD. FLAGGY LIMESTONE:** Creamish to buff, massive to moderately flaggy distinctly fine textured variably silty grainstone grading into wackestone, frequent extensively bioturbated intervals indicated by bedding parallel solution cavities, occ. fine disseminated glauconite pellets.

**CALC SILTY SANDSTONE:** Dull brownish grey, mod. cemented, extensively bioturbated with large inclined tubular burrows up to 4-5 cm visible on surface, few burrows penetrate below from overlying limestone, fine calcareous silty sandstone, lower contact not exposed.